

80 micro

the magazine for TRS-80® users

SEPTEMBER 1985

USA \$4.00

CANADA \$4.50

A CWC/I PUBLICATION

REVIEWED:

Supercross/XT

Supermod4

Little Brother

Offix

MAKING CONNECTIONS

3 Easy Ways
To Transfer
Your Files

MODEL 4 OWNERS!

At Last, a Basic
Cross-Referencer

SUBROUTINE SANDWICHES

Hardin Brothers
Gives You
His 10
Favorites

WHO NEEDS THE MAC?

Try Our Hi-Res
Paint Program!





THE PALANTIR OFFICE SERIES

**NO-NONSENSE SOFTWARE FOR NO-NONSENSE HARDWARE,
AT A NO-NONSENSE PRICE NO BULL!**

The Palantir Office Series...
valuable, no-nonsense software tools
that function compatibly across the
entire Tandy line.

THE Word Processor is designed
for microcomputers but gives you the
feel and features of a dedicated word
processor. It includes MailOut, the
most powerful file merge feature on
the market today.

THE Speller is a fast and easy
spelling checker supplied with a
60,000 word dictionary. THE Speller's

ability to "guess" the spelling of a
suspect word is uncanny.

THE Filer is an amazingly clever
data management program that is the
perfect companion to THE Word
Processor for storing and retrieving
any kind of information you need.

THE Indexer is like having your own
personal librarian in your computer.
It scans your disks and instantly
displays all occurrences of a name, a
phrase, or anything else you need to
find without having to wade through
directories or print-outs.

**The Palantir Office Series does
what it's supposed to do and does it
well.**

Ask your Tandy dealer to show you
the Palantir advanced demonstration.

The no-nonsense Office Series is
available through
Express Order
Software at your
Tandy dealer.



NO BULL!

PALANTIR SOFTWARE

12777 JONES ROAD, SUITE 100 HOUSTON, TEXAS 77070
CALL TOLL FREE 1-800-368-3797 IN CANADA 1-800-235-0025
IN TEXAS CALL 713-955-8880

Circle 288 on Reader Service card

Did you know? Only one spelling checker:

- works with both Scripsit and Superscriptsit.
- integrates with all other popular word processing programs as well.
- requires *no special document placement!* Even runs on a single drive system.
- displays its dictionary so that you can find the correct spelling of words.
- offers integrated Hyphenation Option and Grammar & Style checker.

Electric Webster

SPELLING CHECKER • AUTO-HYPHENATION • GRAMMAR CHECKER

Displays Correct Spellings: If you don't know the correct spelling of a word, EW will look it up for you, and display the dictionary.

Verifies Corrections: If you think you know the correct spelling of a word, EW will check it for you before making the corrections.

Hyphenates Automatically: (Optional). Inserts discretionary hyphens throughout text.

Grammar & Style Checker: (Optional). Identifies 22 types of common errors. Makes suggested corrections with the stroke of a key. Runs within EW.

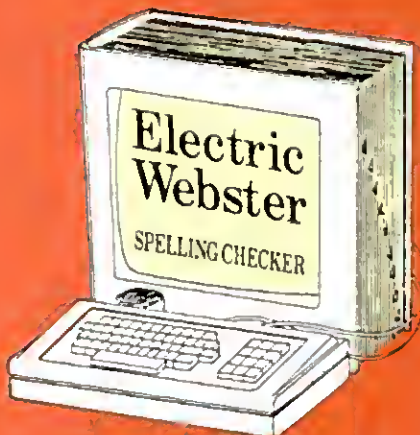
50,000 Word Dictionary: Uses only 2½ bytes per word; add as many words as you wish.

Fast Correcting: In as little as 30 seconds, Electric Webster can return you to your Word Processing program, with your text fully corrected and on your screen.

Integrates: with WordStar, Deskmate, Spellbinder, Volkswriter, Open Access, Allwrite, Newsprint, Lazy Writer, Superscriptsit, Scripsit, Electric Pencil, Copy Art, Powerscript, Zorlof, and LeScript (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.

When ordering, stipulate word processing program and operating system.

**"The Cadillac"
of spelling checkers
— 80 Microcomputing, 9/82**



ACCLAIMED:

"Electric Webster is the best. Just read any review in any magazine and I don't believe that you will find even one disagreement to that statement." *CIN-TUG, Cincinnati's Users Group Mag.* 4/83

"The most helpful program I've found is Electric Webster. After looking at nine proofreading programs, I've settled on Webster..." *Creative Computing* 11/83

This dictionary is not published by the original publishers of Webster's Dictionary or their successors

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World*, 8/82

"Electric Webster, a fantastic spelling and grammar checker" *80 Micro* 4/85

Now see for yourself!

Try Before You Buy:

For the second straight year, 80 Micro readers have voted Electric Webster the #1 Spelling checker. Find out for yourself how accurate, fast and easy proof-reading can be. For only the \$5 cost of postage, materials and handling, we will send you a special Electric Webster demonstration disk that works just like Webster, but proofs only half the alphabet. With it, you'll get a coupon worth \$5 towards the purchase of Electric Webster.

LOW PRICES:

TRS-80, Model I/III or IV	\$ 89.95
w/Correcting Feature	\$149.95
Hyphenation	\$ 49.95
Grammar & Style Checker	\$ 49.95

CP/M, PC/DOS, Model 1000/2000	
Electric Webster,	
w/Correcting Feature,	\$169.95
Hyphenation, and Grammar	



Circle 45 on Reader Service card.

Cornucopia Software

POST OFFICE BOX 6111, ALBANY, CALIFORNIA 94706, PHONE (415) 524-8098



THE SOURCE OF TRS-80 SOFTWARE!

IF YOU BOUGHT YOUR SOFTWARE ELSEWHERE, YOU PROBABLY PAID TOO MUCH

JMG is one of the largest sources of TRS-80 software around. We specialize in software for Models I, III, and 4. Our prices are the best, and if you find a better price then we'll beat it! (see pricing policy) As well, we support the programs we sell. Our software is only all top-quality, and our 99% satisfaction rate speaks for itself. With the best prices, selection, and support all on your side, you can't lose! Model 4 owners: All Model 3 programs we sell will work on the Mod. 4 in "III mode". Remember that JMG now offers FREE SHIPPING on all orders to the continental U.S. or Canada of over \$25!

PRONTO

Specifically designed for the 128K TRS-80 Model 4/4P. Window controller program with many applications included

Models 4/4P (List \$50.00) \$46.50

PASCAL-80

Easiest version of Pascal to learn! Editor and Compiler are already in memory. Nearly complete subset of standard PASCAL

Models I/III (List \$79) \$59.50

PUBLIC DOMAIN DISKS

Public Domain Disk (specify #1 - #7) Each \$9.50

Public Domain Package #1 - #4 \$34.50

Public Domain Package #1 - #6 \$49.50

MACRO TYPING

Typing Tutor. Presents letter sequences, words, sentences and times your typing speed and checks your accuracy

Models I/III \$24.50

POWERDOT II

"The best high-resolution bit-image graphics program on the market for the TRS-80." Your screen becomes a window on your larger full-page drawing board. AUTOORAW feature for lines and circles. POWERDOT II is 100% Machine Language (Please specify printer when ordering.)

MODELS I/III \$29.50

POWERMAIL PLUS

Very possibly the best mailing list program available for the TRS-80. Extremely advanced and yet very simple to use. Written in 100% Machine Language for the quickest operating speed. If desired, your records can easily span multiple drives. Also, you can convert existing files from many other mail systems for use with PowerMail. An exciting price break for an exciting product!

MODELS I/III or 4 \$98.50
with Text Merge option \$128.50

PACKAGE DEAL!

**** MTERM ****

**** MSCRIPT ****

**** DOSPLUS IVa ****

A complete operating system has just become very affordable! This new deal offers an operating system that is much faster and easier to use than TRSDOS. Not only is DOSPLUS IVa itself very user-friendly, it also offers a built-in menu driving system, and of course, GREATLY enhanced BASIC. Other included features of DOSPLUS IVa are: Text Editor, Linker, Assembler; Directory Verification/Repair, Disk Mapping, and File & Disk Editing. As if that is not enough, you now also get MSCRIPT with your purchase of DOSPLUS IVa. That's right, one of the easiest and most convenient to use word processors goes with your purchase. Also, MTERM Smart Terminal (one of the best full featured TRS-80 terminal programs available) is included in this deal. In addition to all of the remarkable features of MTERM, it will also enable you to log on to local Bulletin Boards and tell your friends about this fantastic deal!

DOSPLUS IVa / MSCRIPT / MTERM Package Deal
Models 4/4P (List \$329.85) \$159.50

SUPERCROSS XT

Designed specifically for transferring data and program files between TRS-80 disks and those of other computers

Models I/III or 4 \$94.50
with Convert Basic option \$112.50

T/Maker TM

• WORD PROCESSOR • SPREAD SHEET • GRAPHICS •
• DATA BASE • & MORE!

This integrated software package for the Models 4/4P combines many functions to become one of the best software deals available for the TRS-80. Included are Word Processing, Spread Sheet Analysis (which provide a full range of mathematical functions), Relational Database Management (allows merging, multiple selection criteria, restructure of DataBase, Multiple Sorting etc.), Spelling Checker (55,000 word dictionary, correction feature, ability to create personal and professional dictionaries), Bar Chart Graphics (created directly from Spreadsheet data and supported on any printer), and finally, Data Encryption. If you are worried about learning T-Maker, worry no longer. It has excellent documentation and comes equipped with a Tutorial on the disk. Not only is it a great program, but it is also on SALE!!!

Models 4/4P (List \$299) \$194.50

LE SCRIPT

Great printer support, full Model 4 support and much more! On a 128K Model 4, you can have over 90K of text buffer for use on a single file. Model 4 features available while running in Model III mode. By far LeScript is our most popular program!

Models I/III or 4 (List \$129.95) \$94.50

WORD PROCESSING PACKAGE DEAL

LeScript and Electric Webster together!! Needless to say, these two great programs work excellently together!

W.P. Package (List \$279.90) \$199.50

ELECTRIC WEBSTER

Includes 50,000 word dictionary. Features fast checking, interactive correcting and personal dictionary expansion. (Specify computer and word processor when ordering)

Electric Webster (Models I/III or 4)
(List \$149.95) \$119.50

Grammar or Hyphenation options
(List \$49.95) Each \$38.50



Top of the list for this month are the great specials we have for Model 4 owners: check out the incredible packages we've been able to put together on T/Maker and Dosplus IVa. Also, for you Infocom fans we have the newest release, CUTTHROATS (for Model 3 mode only, folks). Plus our regular assortment of top quality stuff for the TRS-80 Models I, III and 4. Coming next month: new hardware to allow monitoring of dairy farms; yes folks, we're talking cow chips here.

APPLICATIONS/BUSINESS

PROGRAM	(LIST)	JMG
T-Maker (Model 4/4P)	(299.00)	\$194.50
Powerdot II	(59.50)	\$ 29.50
POWERMAIL PLUS	(150.00)	\$ 98.50
POWERMAIL PLUS w/Txt Merge	(175.00)	\$128.50
LESCRIPT	(129.95)	\$ 94.50
LESCRIPT CP/M	(199.95)	\$149.50
LESCRIPT MS/DOS	(199.95)	\$149.50
ZORLOF II	(69.95)	\$ 49.50
MSSCRIPT	(79.95)	\$ 54.50
LAZYWRITER	(125.00)	\$ 99.50
TYPEITALL	(129.95)	\$ 99.50
PowerScript (New Version)	(39.95)	\$ 34.50
ELECTRIC PENCIL	(89.00)	\$ 79.50
TEXTPRESS	(49.95)	\$39.50
ELECTRIC WEBSTER	(149.95)	\$119.50
E.W. Options (each)	(49.95)	\$ 38.50
E.W. MS/DOS (Includes options)	(169.95)	\$149.50
Datagraph	(79.95)	\$ 69.50
Mumford's Disk Indexer	(39.95)	\$ 34.50
Howe's System Diagnostic	(99.95)	\$ 89.50
J & M's Disk Drive Analyzer - I	(89.00)	\$ 84.50
J & M's Disk Drive Analyzer - III	(79.00)	\$ 74.50
ENBASE Data Base Manager	(140.00)	\$129.50
EDIT (Models I/III)	(40.00)	\$ 36.50
Home Accountant (Model III)	(79.95)	\$ 59.50
VersaLedger II (Models I/III)	(149.95)	\$134.50
Versa Series (Models I/III)	each (99.95)	\$ 89.50
TAS's ZMAIL Mail List	(29.95)	\$ 24.50
DOSPLUS 3.5 (Models I/III)	(69.95)	\$ 59.50
DOSPLUS IVA (Model 4/4P)	(169.95)	\$119.50

UTILITIES

Alcor C Compiler	(list 250.00)	\$ 84.50
Alcor Multi-Basic Compiler	(list 250.00)	\$ 84.50
TFC 88S		\$ 99.50
Super Utility 4/4P		\$ 69.50
Super Utility 3.2		\$ 59.50
Supercross XT		\$ 94.50
Supercross XT w/CnvBasic		\$112.50
Edas / PRO-CREATE		\$ 69.50
PRONTO (Model 4/4P)		\$ 46.50
OSMBLR III / PRO-DUCE		\$ 23.50
DIS' n' DATA I/III		\$ 37.50
DIS' n' DATA (Model 4/4P)		\$ 46.50
TASMON Monitor (Models I/III/4)		\$ 34.50
PASCAL 80 Compiler		\$ 69.50
PASCAL 80 For CP/M		\$ 36.50
CNVBASIC (Models I/III/4)		\$ 27.50
Model 4 TOOLBELT		\$ 39.50
PRO-ESP Utility Set (Model 4/4P)		\$ 23.50
6.2 Plus Enhancements		\$ 36.50
ALE - Assembly Language Editor		\$ 39.50
M-ZAL Macro Assembler (Model III)		\$ 79.50
Mumford's Instant Assembler		\$ 44.50
Instant Assembler (Model 4/4P)		\$ 59.50
ZEN Assembler		\$ 34.50
Howe's Monitor #5		\$ 19.50
LC / PRO-LC Compiler		\$114.50
S&E Compiler		\$ 54.50
ACCEL 3/4 Compiler		\$ 89.50
ZBASIC Compiler		\$ 79.50
MULTI00S Version 1.7		\$ 79.50
MULTID0S (Model 4/4P)		\$ 89.50
Lazycomm Terminal		\$ 29.50
Disk Term Terminal		\$ 59.50
MTERM Smart Terminal		\$ 59.50

GAMES

SUPREME RULER PLUS	\$26.50
FLIGHT SIMULATOR	\$29.50
NUCLIX	\$14.50
APE	\$14.50
SIFTER SHIFTER	\$ 8.50
BATTLE OF ZEIGHTY	\$ 8.50
FOREST FIRE DISPATCH	\$26.50
WARRIORS AND WARLOCKS (O&D Adventure)	\$39.50

THE BOOKSHELF

ROM ROUTINES Documented	\$16.50
Model III Assembly Language	\$15.50
The C Programming Language	\$17.50
Programmer's Guide to TRSDOS 6	\$17.50
TRS-80 Disk and Other Mysteries	\$16.50
Basic Decoded and Other Mysteries	\$23.50
TRSDOS 2.3 Decoded	\$23.50
Machine Language Disk I/O	\$23.50
The Custom TRS-80	\$23.50
How To Do It On the TRS-80	\$23.50
Basic Faster and Better	\$23.50
BF8LIB or BF8DEM Disks	each \$16.50
Basic Disk I/O	\$23.50
DF8LOAD Disk	\$23.50

CONVERSION PROGRAMS

BASIC 3 to 4 CONVERT	
Model 4/4P ONLY (list \$49.95)	\$39.50
BASIC 4 to 3 CONVERT	
Models I/III (list \$49.95)	\$39.50
BASIC GW CONVERT	
MODEL 4/4P ONLY (list \$99.95)	\$89.50

ORDERS & INFORMATION: (416) 575-2867

Use this number for ordering and for technical information. Phones are usually staffed Monday to Saturday, 10 A.M. to 7 P.M.

OUR PRICING POLICY:

We will beat any legitimate price advertised for any product that we carry. If you find a lower price advertised, our price will be \$1.00 less, under the same conditions (eg. same shipping and other charges, etc). To receive the lower price you must mention the location of the other ad when ordering.

OUR GUARANTEE:

We sell only top-quality software. If, however, you are unsatisfied with a product you have purchased from JMG, you may return it (in good condition) within 10 days for a refund, less a \$2.50 handling charge for programs under \$50 (\$5.00 for programs over \$50). We also ask that you send us a letter stating the reason for your return.

MONTHLY SPOTLIGHT

ALCOR MULTI-BASIC COMPILER

Uses TRSDOS, LDOS, NEWDOS, DOSPLUS, or MULTIDOS. It is a TRS-80 BASIC compatible compiler. Versions for Models I/III/4. It supports advanced language features, eg. multi-line procedures/functions, recursion, dynamic string management, etc. Includes full screen text editor and advanced development package.

Models I/III or 4 (list \$250) \$84.50

TO ORDER:

We accept orders by phone or mail. When ordering please specify the Model of TRS-80 (that you own, the exact program(s) wanted, and the method of payment. We accept Check, Money Order, VISA, MasterCard. (For Electric Webster please mention your word processor.) All prices are listed in U.S. Funds.

INFOCOM

CUTTHROATS

An out-of-the-way Island! Shipwrecks! Sunken Treasure! and possibly a Cutthroat who would rather slit your throat than share! All this could be yours...

Model III Only \$34.50

"Standard Level" Each \$34.50

PLANETFALL WITNESS
ENCHANTER HITCHHIKER'S

"Intermediate Level" Each \$39.50

ZORK II ZORK III
SORCERER INFIDEL

"Vary Difficult Level" Each \$42.50

DEADLINE STARCROSS
SUSPENDED



THE FINE PRINT:

Regular shipping in continental US and Canada is FREE (our choice of method). COD orders add \$2.50 to cover COD costs. PO's accepted for gov't & schools, add \$5.00 handling charge. Overseas orders will be charged actual shipping costs, specify surface or air. All prices subject to change without notice.

3235 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

OR

710 UPPER JAMES ST.
HAMILTON, ONTARIO
CANAOA L9C 2Z8

Phone: (416) 575-2867

Now Dell & The New York Times® Crossword Puzzles Run On Your Computer.

Since Arthur Wynne ran the first crossword puzzle in a 1913 newspaper, millions of Americans have become devoted puzzle solvers. Now you can be challenged by the best crossword puzzles from either The New York Times or Dell on your personal computer.

And you can do it with all the convenience computers offer:

Ask for hints, check answers, erase, save partial puzzles and much more. Beginners can use Computer Crosswords to become accomplished puzzlers. Experts can test their skills—even match wits with friends in contests.

Each diskette comes with 30 puzzles and sells for only \$19.95. Order both for \$34.95 and save

\$5. Satisfaction is unconditionally guaranteed for 90 days from the date of purchase. Send a check or money order to Computer Crosswords, P.O.B. 60010, San Diego, CA 92106. Add \$2.50 for postage and handling (California residents add 6% sales tax). We will ship C.O.D., or you can charge the puzzles to your MasterCard or VISA.

Call 800-325-1289

California residents call 619-224-3788.

We'll deduct \$.75 from the handling charge to cover California calls.

"2001"

ACROSS

- 1 - Horton the elephant ended here
- 8 - Mrs. Robinson's daughter
- 14 - A villain in "2001"
- 16 - Parts of a computer's makeup
- 17 - It means wedge
- 18 - Witness
- 19 - "2001" computer
- 20 - Cultural pursuits
- 21 - Have dinner
- 23 - Pre-occupied
- 26 - Contest in the country
- 27 - Elevator operator in England
- 31 - Confucian virtue
- 32 - It means dust
- 33 - Pick from the pack
- 35 - Computer type
- 38 - Find (searches line by line)
- 39 - Solver's route?
- 40 - Young calves
- 41 - Zodiac type
- 42 - "2001" earth communication links
- 44 - San Francisco Airport; Abbr.

DOWN

- 1 - No two ways about it
- 2 - Nothing in Naples
- 3 - Highest points
- 4 - Tom, Dick and Harry
- 5 - Fabulous bird
- 6 - Collection of Greek poems
- 7 - The nephew in Donizetti's "Don Pasquale"
- 8 - Old French coin
- 9 - Wales of Poland

10 - "Born"

11 - Employs a trouble-shooting technique

12 - Word in the Postman's Creed

13 - Bitter vetch

15 - Small theater in ancient Greece

17 - Bandleader

22 - A computer language

24 - Agreement

25 - In (all) Lat.

27 - Lack of "fumble-words"

28 - How some golf clubs come

29 - Part of a light bulb; Abbr.

30 - Oscar-winning Patricia et al.

32 - AFL affiliate

34 - Banks' business; Abbr.

35 - Roy's wife

36 - Chilled

37 - _____ a

38 - Nemo's million

40 - Hatred

43 - Walden on "Lon Grant"

44 - Bernhard of "The King of Comedy"

45 - Most liberated

46 - badkins!

48 - Hitler Road

50 - Australian cry

52 - Actress Rowlands

54 - Exclamation from Down Under

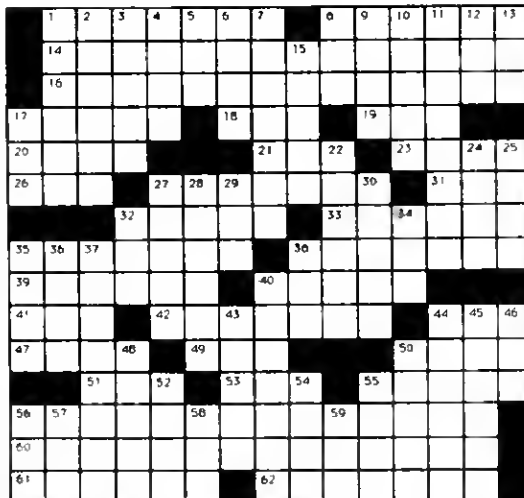
55 - Totals; Abbr.

56 - Quick

57 - NYSE name

58 - Eyebrow or eye sore

59 - Understand, as a joke



System requirements: 48k—TRS-80* I, III, & IV; IBM* PC or compatible (e.g., Tandy 1000*) Apple* IIx; Commodore*; Atari*.

Purchase the puzzles or circle the Reader Service number and we will send you the answers to this original Computer Crosswords puzzle.

COMPUTER CROSSWORDS™

*Registered Trade Mark

©EVOLVING TECHNOLOGY COMPANY

PUBLISHER
Peter Hutchinson

EDITOR-IN-CHIEF
Eric Maloney

MANAGING EDITOR
Peter E. McKie

SENIOR EDITOR
Penelope Hamblin

REVIEW EDITOR
Ryan Davis-Wright

COPY EDITOR
Trudy Nelson

TECHNICAL EDITORS
Bradford N. Dixon

Mare-Anne Jarvela
Keith Johnson (Lead 80)

Dave Rowell
Beverly Woodbury

PROOFREADER
Vinoy Laughner

EDITORIAL ADMINISTRATION
Carole Mactocl

ASSOCIATE EDITORS
Hardin Brothers

David Engelhardt
John B. Harrell III

Terry Kepner
Thomas L. Quindry

ADVERTISING SALES

SALES MANAGER
William Smith

SALES REPRESENTATIVE
Michael Wozmak

1-800-441-4403

WEST COAST OFFICE
1060 Marsh Road

Menlo Park, CA 94025
415-328-3470

SALES REPRESENTATIVE
Allison Walsh

ADVERTISING COORDINATOR
Judy Walker

ADVERTISING SECRETARY
Cathy Berry

MARKETING/PROMOTION DIRECTOR
Jane Butterfield



The left bracket, [, replaces the up arrow used by Radio Shack to indicate exponentiation on our printouts. When entering programs published in 80 Micro, you should make this change.

80 Micro formats its program listings to run 84-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of "How to Write for 80 Micro." Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased.

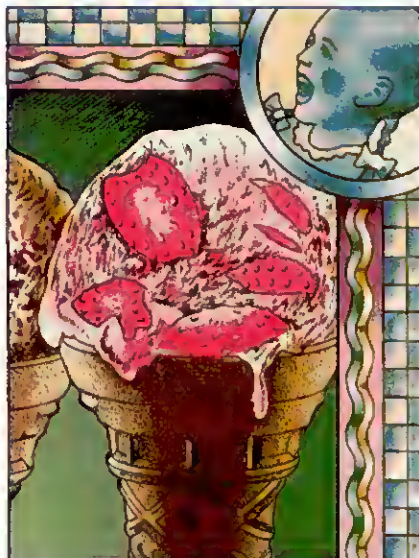
*TRS-80, Script, and TRSDOS are trademarks of Radio Shack, a division of Tandy Corp.

80 Micro (ISSN-0744-7868) is published monthly by CW Communications/Peterborough Inc., 80 Pine St., Peterborough, NH, 03458. Phone: 603-924-9471. Second class postage paid at Peterborough, NH, and additional mailing offices. (Canadian second class mail registration number 9563.) Subscription rates in U.S. are \$24.97 for one year, \$38 for two years, and \$53 for three years. In Canada and Mexico \$27.97—one year only, U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), \$44.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail) please inquire. In South Africa contact 80 Micro P.O. Box 782815, Sandton, South Africa 2146. All subscription correspondence should be addressed to 80 Micro, Subscription Department, P.O. Box 981, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to 80 Micro, Subscription Services, P.O. Box 981, Farmingdale, NY 11737. Send Canadian changes of address to 80 Micro, P.O. Box 1051, Fort Erie, Ontario L2A 5N8, Canada. Return postage guaranteed.

Enlira contents ©copyright 1985 by CW Communications/Peterborough Inc. No part of this publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.



page 36



page 48



page 56

Features

36. **You Can Get There from Here**
by Bradford N. Dixon
What it takes to transfer files from one computer to another.
41. **The Perfect Host**
by Bennett Shulman
Step-by-step instructions for using Memdisk to transfer data at high baud rates.
(Model 4)
48. **My 10 Favorite Assembly-Language Subroutines**
by Hardin Brothers
The author serves up an assortment of input and screen-handling routines to merge with your Basic programs.
(Models III and 4; Load 80)
56. **Drawing in Detail**
by Jim Abbassian and Glen E. Sparks
Draw on our MacPaint-style graphics editor for classy high-resolution designs.
(Models III and 4; Load 80)
66. **A Basic Programmer's Best Friend**
by Raymond Pelzer
Debugging is less of a bore with this cross-reference utility.
(Model 4/4P; Load 80)

Departments

- | | |
|-----------------------------|----------------------------------|
| 6. Load 80 Directory | 86. Basic Takes |
| 8. Side Tracks | <i>by Richard Ramella</i> |
| <i>by Eric Maloney</i> | 90. The Next Step |
| 12. Input | <i>by Hardin Brothers</i> |
| 14. Feedback Loop | 94. Spreadsheet Beat |
| <i>by Terry Kepner</i> | <i>by Doug Peterson</i> |
| 21. Pulse Train | 102. Express Checkouts |
| <i>by Bradford N. Dixon</i> | The Offix Personal Office System |
| 25. Reader Exchange | IDEA! |
| 29. Reviews | HomeworD |
| <i>edited by</i> | <i>Inside CP/M Plus: A</i> |
| <i>Ryan Davis-Wright</i> | <i>Guide for Users</i> |
| <i>Supercross/XT</i> | 112. Tidbit #27 |
| <i>Aceounts Receivable</i> | 118. New Products |
| <i>Little Brother</i> | <i>edited by</i> |
| <i>Teach Your TRS-80 To</i> | <i>Mare-Anne Jarvela</i> |
| <i>Program Itself</i> | 125. MS-DOS New Products |
| <i>Brainstormer</i> | <i>edited by</i> |
| 76. Project 80 | <i>Mare-Anne Jarvela</i> |
| <i>by Roger C. Alford</i> | 128. Ask Tandy |
| 82. Dave's MS-DOS | |
| Column | |
| <i>by Dave Rowell</i> | |

LOAD 80

Load 80 gathers together selected programs from this issue of 80 Micro and puts them on a magnetic medium for your convenience. It is available on tape or disk, and runs on the Models 1, III, and 4.

Load 80 programs are ready to run, and can save you hours of time typing in and debugging listings. Load 80 also gives you access to Assembly-language programs if you don't have an editor/assembler. And, it helps you build a substantial software library.

Using Load 80 is simple. If you own a tape system, load the Load 80 tape as per the instructions provided. If you own a

Model I or III disk system, you boot the Load 80 disk and transfer the files to a TRSDOS system disk according to simple on-screen directions. If you own a Model 4, copy the Model 4 programs from the Load 80 disk to your TRSDOS 6.X disk using the COPY command.

Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly subscriptions to Load 80 are \$199.97 for disk, or \$99.97 for cassette. Individual loaders are available on disk for \$21.47 or on cassette for \$11.47, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to Load 80, 80 Pine St., Peterborough, NH 03458.

Directory

Subroutines

Article: My 10 Favorite Assembly-Language Subroutines (p. 48).
Systems: Model III, 32K RAM;
Model 4, 64K RAM.

Ten input and screen-handling subroutines.

Languages: Disk Basic, Assembly.
Cassette filespecs: B, C, LIST4, D.
Disk filespecs: LIST1/BAS,
LIST2/BAS, LIST3/SRC (source
code), LIST4/SRC (source code),
LIST5/BAS.

Crosscheck

Article: A Basic Programmer's
Best Friend (p. 66).
System: Model 4/4P, 64K RAM.

A Basic cross-reference program.
Languages: Disk Basic, Assembly.
Cassette filespec: E, CROSS.
Disk filespecs: CROSSCHK/BAS,
CROSS/SRC (source code),
CROSS/CMD (object code), KEY-
WORDS/ASM (source code).

Rembrandt

Article: Drawing in Detail (p. 56).
System: Model III, 64K RAM;
Model 4, 64K RAM; high-resolu-
tion board.

An icon-driven graphics editor.
Language: BasicG.

Cassette filespecs: F, G, H, I, J.
Disk filespecs: REMBRAN3/BAS,
REMBRAN4/BAS, SCRNGRID/
BAS, HEXAGON/BAS, COM-
PUTER/BAS.

Line

Article: The Next Step (p. 90).
Systems: Models I and III, 32K
RAM, Radio Shack EDTASM.

A line-drawing subroutine and
sample Basic program.

Language: Disk Basic, Assembly.
Cassette filespecs: LINE, K.
Disk filespecs: LINE/SRC (source
code), LINE/BAS.

Report Card

Article: Spreadsheet Beat (p. 94).
Systems: Models I and III, 48K
RAM, VisiCalc.

Calculate students' grades
based on tests, assignments, and
classwork.

Disk filespecs: RPTCARD/VC.

ART DIRECTOR
Beth Krommes
PRODUCTION SUPERVISOR
Dion Owens/Kanner
PRODUCTION ASSISTANT
Janel Brown
AD/GRAPHICS PRODUCTION
Gary Cioceci

GRAPHIC SERVICES MANAGER
Dennis Christensen
MANUFACTURING MANAGER
Susan Gross
FILM PREPARATION SUPERVISOR
Robert M. Villeneuve
TYPESETTING SUPERVISOR
Linda P. Canale

CHAIRMAN
James S. Povee
PRESIDENT
Debra Wetherbee
VICE PRESIDENT/FINANCE
Roger Murphy
ASSISTANT GENERAL MANAGER
Matt Smith
ASSISTANT TO VP/FINANCE
Dominique Smith
DIRECTOR OF CIRCULATION
William P. Howard
CIRCULATION MANAGER
Frank Smith
DIRECT AND NEWSSTAND SALES MANAGER
Raine Wiren
1-800-343-0728
DIRECTOR OF CREDIT SALES
AND COLLECTION
William M. Boyer
EXECUTIVE CREATIVE DIRECTOR
Christine Desrempes
FOUNDER
Wayne Green

Cover photograph by White/Packert Photography

80 Micro is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in 20 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina, Asia's The Asian Computerworld, Australia's Computerworld Australia, Australian PC World, Macworld and Directions, Brazil's DataNews and MicroMundo, China's China Computerworld, Denmark's Computerworld/Denmark, PC World and Run(Commodore), Finland's Mikro, France's Le Monde Informatique, Golden (Apple) and OPC (IBM), and Distributique, Germany's Computerwoche, Microcomputerwelt, PC Welt, SoftwareMarkt, CW Edition/Seminar, Computer Business, Run and Apple's, Italy's Computerworld Italia, and PC Magazine; Japan's Computerworld Japan, Mexico's Computerworld/Mexico and ComputoMundo, The Netherlands' Computerworld Benelux and PC World Benelux, Norway's Computerworld Norge, PC WORLD and Run (Commodore), Saudi Arabia's Saudi Computerworld, Spain's Computerworld/Espana, Microsistemas/PC World, Commodore World Sweden's ComputerSweden, Mikrodata, and Svenska PC; the UK's Computer Management; Computer News, PC Business World, and Computer Business Europe; Venezuela's Computerworld Venezuela; the U.S.' Computerworld, HOT CoCo, inCider, InfoWorld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine, Focus Publications, On Communications, and 80 Micro.

Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: 80 Micro, Subscription Department, P.O. Box 961, Farmingdale, NY 11737.

Problems with Load 80 Circulation: Address correspondence to Load 80, 80 Pine St., Peterborough, NH 03458.

Problems with Advertisers: Send a description of the problem and your current address to: 80 Micro, Rt. 101 & Elm Street, Peterborough, NH 03458, ATTN: Rita B. Rivard, Customer Service Manager. If urgent, call 1-800-441-4403.

Change of Address: Send old label or copy of old address and new address to: 80 Micro, P.O. Box 961, Farmingdale, NY 11737. Please give eight weeks advance notice.

Microfilm: This publication is available in microfilm from University Microfilms International, United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.

Dealers: Contact Raine Wiren, Retail Sales Manager, 80 Micro, Pine St., Peterborough, NH 03458. (800) 343-0728.

DiskCount Data

2701-C W 15th • SUITE 612 • PLANO, TX 75075 • (214) 680-8268

All MOD III programs specified in this ad will run on the Model 4 (in the MOD III mode)

WE WILL NOT BE UNDERSOLD!

ELECTRIC WEBSTER WITH CORRECTING FEATURE LIST 149.95 SALE 119.95

HYPHENATION OPTION 38.95
GRAMMAR & STYLE 38.95

WINDOWS ON MOD 4

NOW PRO-TO FROM MISOSSYS ALLOWS MODEL 4 USERS TO CREATE AND USE WINDOW OVERLAYS ON THE MOD 4 SCREEN AT THE TOUCH OF A SINGLE KEY. COMES COMPLETE WITH THE WINDOWING UTILITY, ROTATING INDEX FILE, ADDRESS FILE, APPOINTMENT SCHEDULER, CALCULATOR, 2 CALCULATORS, CARD FILER, NOTEPAD, PHONE LIST & AUTO DIALER, AND A MINI TERMINAL. A TRULY INCREDIBLE SOFTWARE SET FOR ONLY 49.95

Requires 128K MOD 4 & TRSDOS 6.2

APPLICATIONS

Macro Typing Tutor I/III/4	39.95
ST-80 III	69.95
Miracle 1000/1200	279.00
Survey Analyst	195.00
Masterdirectory Mod III	29.95
Superdirectory Mod I/III	44.95
Datagraph I/III/4/Max	69.50
Datagraph Pie Chart Option	29.95
The Basic Checkbook I/III	64.95
Mterm I/III/4	59.50
Mterm MSDOS 1000/1200	74.95
Loan Amortization III	29.95
PowerMail Plus I/III/4	124.95
Text-Merge for PowerMail	49.95
PowerMail w/Text-Merge	149.95
The Home Accountant III	62.50
Inventory Control/ICS Pro	148.00
ICS/PRO 1000 & 1200	300.00
Ultraterm I/III	44.95
Ultraterm 2.0 w/uto-logon	59.95
TallyMaster	79.95
SPS Statistical Analysis Mod I	150.00
SPS as above for Mod III inquire	

BBS-80 ONLY 74.95

A COMPLETE SYSTEM AT A FRACTION OF THE COST OF SIMILAR SYSTEMS. MOD I OR III SPECIFY

BBS-PC SALE 150.00

Reduced from 225.00

THE MOST INCREDIBLE BBS SYSTEM WE'VE SEEN. UP TO 8 DIFFERENT BBS IN ONE. CALL FOR MORE DETAILS. ALL COMPATIBLE PC'S 1000/1200 2000 VERS. AVAIL

INFOCOM GAMES

PLANETFALL • ENCHANTER • WINTNESS • MOD I or III	34.95
ZORK II • ZORK III • INFIDEL • SORCERER • MOD I or III	39.95
DEADLINE • STARCROSS • SUSPENDED • MOD I or III	44.95
THE NEW HITCHHIKERS GUIDE • OR SEASTALKER • MOD III ONLY	34.95

SCHOOL UTILITY AND EDUCATIONAL

Mostly Basic Educational Tape	14.99
Time Dungeon U.S. History Tape	19.95
Time Dungeon World History Tape	19.95
Test Question Data Bank	49.95
Test Generator/Drill	34.95
Football Scouting	49.95
Basketball Statistics	39.95
Baseball Statistics	39.95
Computer SAT III-1000-1200	79.95

GRAPHIC GAMES AND SIMULATIONS

Voyage of the Valkyrie I/III	29.95
Voyage of the Valkyrie Tape	19.95
Meltdown (Nuclear Powerplant)	19.95
Gamepak-3 (Funface, Match, etc.)	29.95
Pro-Pix NFL Version	29.95

THE FBN GENERAL LEDGER

Absolutely the finest G/L on the market MOD III.
RETAIL \$300.00 NOW 149.95

INFOSCAN

By MICRO MINING

ONLY 44.95

An Excellent Screen

Oriented Key-Word

Date Base

This super fast reference utility can be used to organize, store and retrieve any type of information that is useful to you. It combines the features of a word processor, data base manager and information retrieval and display utility. Design your own screen form and fill in the information. Enter the large or small display window may be used, and different forms and information can be in the same file. Information is retrieved using the impressive visual key scan bracket. Completely machine language. Infoscan will display any record in less than 1 second. Complete error trapping is built in leaving Infoscan very simple to operate. Completely menu driven. Infoscan uses a "display window" theme for menus, keyword lists, displayed data and program status. Truly an outstanding program for information management.

MOD I/III

BOOKS, WALL CHARTS & MISC

Inside Super Utility (new issue)	17.95
Super Utility Tech Manual 3.x	13.95
TRS-80 Encyclopedia I/III/4	19.95
TRS-80/Z-80 Assembly Library	31.95
TRS-80 Disk & Other Mysteries	19.95
The Custom TRS-80 & Other Myst	26.95
Microsoft Basic Decoded	26.95
Machine Language Disk I/O	26.95
Basic Disk I/O & Other Myst	26.95
How To Do It On The TRS-80	26.95
TRSDOS 2.3 Decoded & Other Mys	26.95
Basic Faster & Better	26.95
BFB Library Disk I/III	16.95
BFB Demo Disk I/III	16.95
TRSDOS 6/LDOS Programmers	
Guide	14.95
Green Screens I/III/III/4/4P	16.95
Diskettes SDD 10 in Plastic Bx.	15.00
Volt Guard Surge Protector	39.95
Profile 3 - Commands Wall Chart	4.00
Visicalc Commands Wall Chart	4.00
Superscripts Wall Chart	4.00
Model III Basic Wall Chart	4.00
Model 4 Basic Wall Chart	4.00

*Charts not shipped as separate order

WORD PROCESSORS & PRINTER DRIVERS

Lazy Writer I/III/4	119.95
Lazy Font I/III/4	44.95
M-Script I/III/4	53.50
M-Script 1000/1200 MSDOS	74.95
LeScript I/III/4/Max	104.95
LeScript MSDOS-1000-1200	179.95
Clean Slate I/III	49.95
Electric Webster (specify)	119.95
Grammar & Style (specify)	38.95
Nyphenation Opt. (specify)	38.95
PowerDriver-E Epson I/III/4	29.95
PowerDriver-P Prowriter I/III/4	29.95
PowerDriver-S Starwriter I/III/4	29.95
PowerDriver-O Okidata 92 I/III/4	29.95
PowerDriver-FX (FX/RX) I/III/4	29.95
Epson Driver Compiler	29.95
PowerScript for Scripts I/III/4	34.95

NOTE: If your printer driver is not listed, call, we have more

\$100 FREE SPECIALS \$200

Order over \$100.00 and select one of the following ABSOLUTELY FREE. Order over \$200.00 and you may select any two items: 80 Micro's 465 page Review Guide • Voyage of the Valkyrie • Meltdown • The Rest of 80 250 page Book • Superkeys Mod III • The Green Window CRT Screen • Varkeep & Screenpacker Plus • Master Directory Mod III • Agri-Calc Feeder Pig Module •

UTILITIES

FAST/CMD Run Mod III TRSDOS 1.3	
Programs on Mod 4	
at high speed	29.95
J&M Memory Minder I	64.95
J&M Memory Minder III/4	74.95
TextPress I/III (ASCII Comp.)	49.95
Ale Editor/Assembler I/III	38.95
The Toolbox for LDOS	44.95
LC Compiler/EDAS I/III or 4	124.95
ALCOR C Complete System	83.95
ALCOR Multi-Basic Compiler	83.95
AOS Superkeys Key Macros Mod III/35.00	
6.2 Plus. (Enhance TRSDOS 6.2)	36.95
The Toolbelt Mod 4	44.95
AOS Utils • 1 Varkeep/Scrnpr	49.95
Impact for Basic I/III	34.95
Pro-Cess Mod 4	24.95
Pro-Create Mod 4	74.95
Pro-Cure Mod	39.95
Pro-Duce Mod 4	24.95
Pro-Pads Mod 4	39.95
Pro-LC Mod 4	124.95
Pro-Zcat Mod 4	24.95
Enigma Encryption Utility	34.95
Basic-S Compiler System	34.95
M-ZAL Release 3 Mod I/III	74.95
Zues Editor/Assembler I/III/4	74.95
Master Mechanics Set for LDOS	24.99
E-Basic (specify DDS)	49.95
System Diagnostic I/III/4	89.99
ConvBasic/Mod I/III/4	29.95
Hypercross/XT 2.0	93.95
Trashman	32.50
Faster	22.95
RPM	21.50
DSMBLR III I/III	24.95
Accel 3/4 Basic Compiler I/III	94.95
Monitor 5 I/III/4	22.95
Hyperzap Disk Utility I/III/4	49.95
Superdos enhance TRSDOS 1.3	29.95
Z-Basic Compiler	79.50

TRS-80 ENCYCLOPEDIAS

FULL 10 VOLUME SETS

	RETAIL	SALE
Hard Cover	199.50	89.95
Soft Cover	109.50	66.99

Get these collector's sets while quantities last.

MSDOS SOFTWARE

Call us for all of your MSDOS software needs IBM-PC, TANDY 1200/1000, Leading Edge PC, etc. We have thousands of programs available at great prices

GRAPHICS

Powerdraw I/III	34.95
Graphit (Line Graphing)	34.95
AOS Utils. Screenpacker Plus	49.95
PowerDot II I/III Spec. Printer	54.95
Datagraph	69.50
Lazy Font I/III/4 Spec. Printer	44.95

SUPER UTILITY PLUS

By POWERSOFT

SALE

VOTED AS THE OUTSTANDING UTILITY BY 80-MICRO READERS

PROTECTED MEDIA

VER 3.2 MOD I/III	62.50
VER 4/4P MOD 4/4P	69.95

OR THE ALL NEW
SUPER UTILITY MSDOS
INTRODUCTORY PRICE
ONLY \$79.95

OPERATING SYSTEMS

CP/M 2.2 Montezuma Mod 4	169.95
R-Shack HD Driver for CP/M 2.2	30.00
Dosplus 4A With M-ZAL	114.95
Dosplus 3.5 I/III	54.95
Dosplus 3.3 Mod I S or DD	29.95
Multidos 1.7 I/III	79.00
Multidos Mod 4	69.95

TRSDOS-MSDOS-CPM

CONVERSION UTILITIES

SUPERCROSS/XT	93.95
SUPERCROSS/XT	
W/CONVBASIC	109.95
HYPERCROSS/XT 2.0	93.95
HYPERCROSS/XT 1.8	79.95

THESE UTILITIES ARE A MUST FOR CONVERTING TRSDOS TYPE PROGRAMS TO YOUR MSDOS OR CPM COMPUTER. ALL MENU DRIVEN. THEY DO THE COMPLETE CONVERSION ON YOUR TRS-80. MOD I NEEDS DOUBLE DENSITY. THE CONVBASIC IS AVAILABLE SEPARATELY FOR 29.95.

Specify MOD 100, MOD III, MOD 4

DiskCount Data

214-680-8268

Monday - Friday 10:00 to 8:00 CST

Saturday 10:00 to 5:00 • Closed Wednesdays

Send Cash, Check or Money Order. Please add \$3.00 for UPS Shipping or \$4.00 for US Postage & Insurance. COD's send an additional \$3.00 COD fee. All COD's will require cash or certified upon delivery. Foreign orders are welcome. All shipping charges assumed by purchaser. When ordering by mail, please specify computer model number.

Phone Your Order In Today Or Mail To:

DISKCOUNT DATA, 2701-C WEST 15th, SUITE 612, PLANO, TX 75075



and VISA Cheerfully Accepted

On Piracy, Scripsit, and the Model 4P

I see by my directory that my Side Tracks disk is filling up with lots of little 1.5K files. Time to chain them together and clean up this mess.

Piracy—No Longer an Issue?

Ah, to be young again. Remember those hot and furious days when copy protection was the issue in the TRS-80 community? When the mere mention of the words would give users and vendors apoplexy?

That was back in late 1982 and early 1983. In the eye of the storm was Powersoft's SuperUtility Plus, a program that would unprotect disks but was itself copy-protected. *80 Micro* kicked off the fuss when we asked readers whether we should publish the address of a reader who wanted to offer a way to unlock SU.

We received more mail on the subject than on any other in our history. On one side were consumers who felt they had a right to copy disks for their own use. On the other were manufacturers who argued that protection was the only reasonable way to stop piracy.

Now comes the news that Powersoft has decided to remove the protection from SU. The company is not protecting its new IBM PC version of SU and could not justify protected and unprotected versions of the same product.

I suspect that Powersoft's move will prompt little comment from the TRS-80 community. While protection remains a volatile topic in other markets, it stimulates about as much debate among TRS-80 users as last week's weather.

Perhaps copy protection is no longer necessary. Perhaps all the pirates moved on to Commodore, IBM, and Apple machines. Or perhaps the manufacturers have given up, choosing to trust consumers and hope their trust is rewarded.

When You're Number 3...

I see from an Infocorp. study published in *InfoWorld* that Scripsit was the third best-selling word processor on the market in 1984. It sold 150,000 units, surpassed only by Applewriter (254,000) and Wordstar (290,000), and accounted for 13 percent of worldwide word processing sales. Among the packages it beat out were PFS:Write, EasyWriter, Multimate, and Perfect Writer.



If nothing else, the study points to the TRS-80's invisible but significant presence in the microcomputer industry. It also indicates how important such reports can be in giving a product credibility. Too bad Tandy is so reluctant to give out sales figures on its computers and software; such editorial coverage goes further than advertising and word of mouth ever could.

So Long to the 4P

I liked the Model 4P. It was a classy piece of hardware, with a clean design and nice feel. When Tandy discontinued the machine in May at \$650—half-price—it gave consumers the best bargain they've ever gotten from a major computer manufacturer. Many shoppers apparently agreed; by the end of May, you couldn't find a 4P to save your life. It's unfortunate that more people didn't discover the machine sooner.

But while the demise of the 4P is lamentable, it's easily explained. To begin with, Tandy never really marketed the machine. The company seemed instead to sneak it into Radio Shack stores in the dead of night. In fact, some people in The Towers didn't even know the machine existed until they saw it in the catalog.

But the chances are that the 4P's life would have been short even if Tandy hadn't orphaned the computer. Transportables simply don't have much of a market niche. They're neither fish nor fowl; they don't have the full capabilities of a desktop, but aren't as manageable as a true portable.

Tandy's experience with the 4P proves once again that a good product doesn't necessarily translate into good sales. You need potential customers and you need to market it aggressively.

As for all you new 4P owners, congratulations. You got a deal, the kind you probably won't find again for a while.

More on Word Processing

Last month I discussed some of my reservations about word processing. I have several other comments that didn't make the editorial cut, these from an editor's, rather than a writer's, perspective.

I've noticed a disturbing trend among some writers to use their word processors as a smoke screen to hide mediocre writing. Their manuscripts will be impeccably produced on letter-quality printers, with proportional spacing, justified type, boldface and italics, and centered heads. They will even include, in the upper right-hand corner, the exact number of words in the article.

The manuscript looks and feels great, until I start reading it. Then I discover that it's full of muddy prose, poor grammar, spelling errors, and incorrect punctuation. These people should have invested in remedial writing lessons instead of daisy-wheel printers and fancy word processors.

Then there's the case of the query I got recently from a would-be author who had obviously merged a mailing list with a form letter, adding my name and "*80 Micro*" where appropriate. The results included such seductive lines as "Thank you, Eric Maloney, for the opportunity to write for your publication: *80 Micro*."

Needless to say, this was one opportunity the writer will never enjoy.

The IBM Influence

Here's an interesting fact gleaned from recent *80 Micro* surveys: Somewhere between 20 and 25 percent of our readers own or use an MS-DOS machine. This puts IBMs and compatibles fourth behind the 4/4P, III, and I. Many of these MS-DOS systems are used by people who also own TRSDOS machines, showing IBM's influence even in the TRS-80 world. Vendors of TRS-80 products would do well to note the potential here to expand into new markets, if they haven't done so already. ■

★ ★ ★ ★ ★
80 MICRO
JUNE, 1985
 Bug free: ★ ★ ★ ★ ★
 Does the job: ★ ★ ★ ★ ★
 Easy to use: ★ ★ ★ ★ ★
 Good docs: ★ ★ ★ ★ ★

CAMEO

ROMAN

Nostalgia

LOMBARDIAN

Pump

celtic

Elegant

Playbill



OUTLINE

Pretorian

CHAINED

SHADOW

Chancery Medium

POKER

HANUKAH

BACKLITE
BUCKLE

Rotunda

REV BAN

Calligraphy

Old English

INCISED TRAJAN

BELLS

GITY

Mini Cubes

Small Boldface

XMAS

USA

CLIMBING Small Bold Italics

MOON LITE

W R I T E R

Circle 91 on Reader Service card.

DOTWRITER printed these on an Epson MX-80.

See What You Can Do With DOTWRITER!

DOTWRITER lets you create spectacular, eye-catching signs, invitations, letterheads, large sideways banners, catalogs, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it is available for your TRS-80 Model 4/4P (yes, in native mode), as well as for the Models I and III.

WHAT IS DOTWRITER?

DOTWRITER uses the "bit-image" graphics of your printer to produce the kinds of stunning results shown inside the box. It is a full-function text printing program, so you can inter-mix different character sets, do centering, paragraphs, pagination, magnification, draw horizontal and vertical lines, reversals (black on white), and even print right-justified proportional text.

DOTWRITER includes the printing program, complete documentation, and fourteen useful typefaces (60 to 90 characters per typeface). We will include the 170-page Letterset Reference summary at half-price (\$10.00) with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor (such as ALLWRITE or

SuperScripts), add the necessary formatting commands, and DOTWRITER will do the rest.

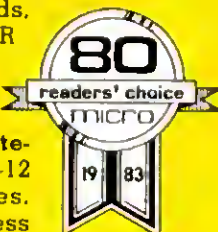
36 more letter-set disks are available separately. Each has 3-12 complete typefaces. The disks cost less than \$25 each and you may purchase them at any time.

SIDWAYS SPREADSHEETS

If your VisiCalc spreadsheets are too wide for your printer, our "LONGVIEW" option may be just what you need. It is an add-on that turns spreadsheets sideways so that DOTWRITER can print them down the page instead of across. LONGVIEW comes with three additional fonts.

EQUIPMENT REQUIREMENTS

DOTWRITER needs a TRS-80 I, III, 4 or 4P with 2 disk drives and 48K of memory. Separate versions of DOTWRITER support EPSON MX-80 with Graf-trax, MX-100 with Graftrax-Plus, and FX, IX, RX; C-ITOH 8510/1550; MICROLINE 84-2/92/93; RADIO SHACK DMP 110-2100/CGP-220; GEMINI 10X/15X and other STAR printers.



We printed our samples on an Epson; sizes may vary on other printers. Many of the fonts shown above are available at extra cost.

Send for free print samples! We've only shown you a few of the 240 DOTWRITER fonts. For the best in TRS-80 graphics printing, we suggest you order DOTWRITER today, toll-free.

Please specify Printer and Computer when ordering.

DOTWRITER	\$99.95
LONGVIEW	29.95
Additional Letterset disks (3-12 fonts/disk)	24.95
	3 for 49.95
Letterset Reference Book	20.00

FREE bonus disk with two Banner fonts when you order DOTWRITER!

ORDER NOW, TOLL-FREE
 (800) 824-7888, oper. 422

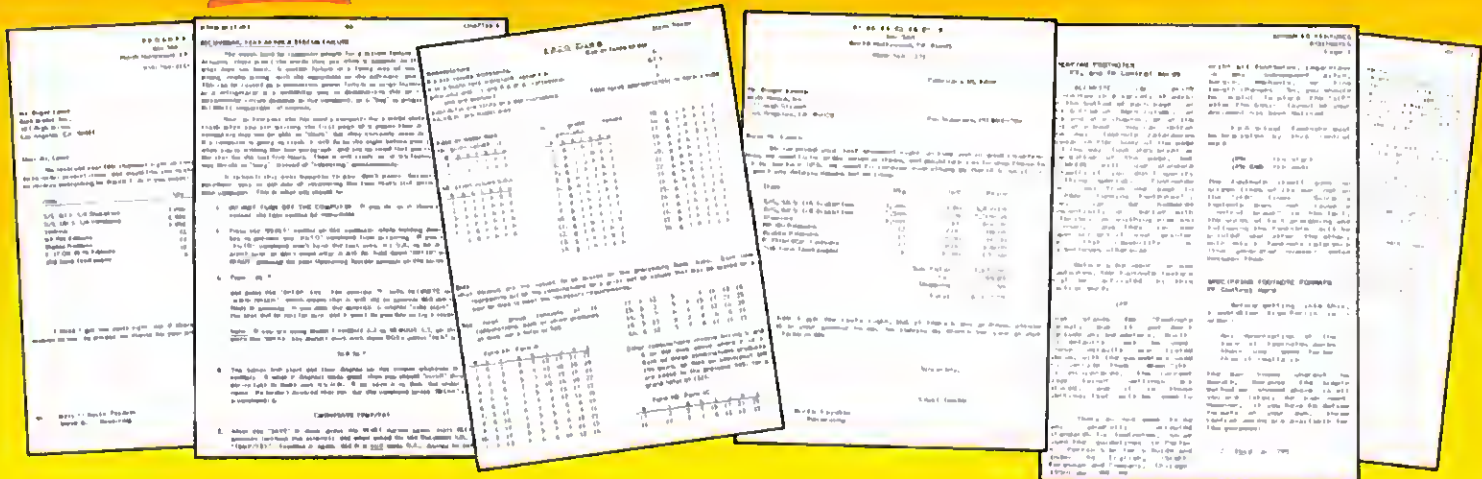
PROSOFT

Dept. C, Box 560, No. Hollywood, CA 91603
 (818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add \$3.00 shipping in U.S. or Canada. Sales tax in CA. Most orders filled within one day.

ALLWRITE!

The Premier Word Processor for Your TRS-80 Model I, III, or 4



These were printed by ALLWRITE, shown 20% actual size.

We are proud to offer you the one Word Processor that will satisfy all your writing needs: ALLWRITE. It sets new standards for text editing and printing, and will give new life to your TRS-80. Let us tell you why...

In an attempt to push the public into expensive 16-bit computers, many manufacturers have been saying that the TRS-80 is obsolete. The truth is that the software, not the hardware, makes the difference. And the best word processor of all is now available only on the humble TRS-80, not on those expensive 16-bit machines!

ALLWRITE will save you time and let you produce the highest-quality, most professional-looking letters, term papers, and reports available on a micro-computer.

Allwrite Can Save You Time!

Reads a 25,000 character file (10 printed pages) from disk in SIX SECONDS... does a global search-and-replace in FOUR SECONDS... outruns even the fastest popular micro-printer.

ALLWRITE'S Screen Handling Makes Word Processing Easier Than Ever

Change text width at any time; wide lines shift left and right as you type. ALLWRITE preserves double-blanks between sentences, uses the entire screen for text, and displays a complete Status Screen at the touch of a key. Scroll by line, partial screen, full screen, to top or end of file, or to any marked point. Move cursor by character, word, tab, line, or screen.

You can set and change on-screen tabs and store them on disk. The print-time tabbing features are incredibly versatile: they allow left, right, and centered tabs, and even line up your decimal points.

ALLWRITE shows you where you forgot to turn off underlining, boldface, italics, or double-width. Special on-screen Preview feature shows page breaks and page layouts... including underlining and boldface. In "Summary" mode, ALLWRITE quickly flags formatting errors

without wasting time printing all the text. These standard features make document preparation faster and easier than ever!

State-Of-The-Art File Handling

There is no upper-limit on document size with ALLWRITE, because it chains files backwards as well as forwards, even across diskettes. Switch from one chained file to another in less than six seconds by pressing two keys. Select portions of other files for inclusion at print time... great for stock paragraphs.

ALLWRITE salvages text from bad disks! If a sector goes bad, you won't lose the entire file, because it

TAKES FULL ADVANTAGE OF YOUR MODEL 4.

The model 4 version of ALLWRITE uses the entire 80-by-24 screen. On a 64K machine, you can edit over 34,000 characters of text. On a 128K machine, you can edit **THREE FILES AT THE SAME TIME!** The second and third files can be over 32,600 characters each, for a total of **almost 100,000 characters** of text in memory.

will skip bad sectors, read the rest of the file, and then show you where the lost text belongs. This advanced error recovery turns a disaster into a feeling of profound relief.

User-Definable Soft Keys Reduce Typing Time

You can store 22 phrases or commands at a time into "soft-keys," then press just two keys to retrieve them. This makes frequently-used phrases and formatting controls a snap to use. You can store these definitions on disk and build a library of hundreds of pre-programmed keys to fit every one of your applications.

Our specially-designed templates fit right on your keyboard to let you see your settings at all times. Each template is also a Reference ("Cue") Card, so it is always right in front of you when you need it, without using up valuable screen space.

ALLWRITE Is Easy To Learn

ALLWRITE's commands and control keys are easy to remember because they use the first letters of common English words: 'CE' stands for 'Center,' 'Search' and 'Replace' do just that, and so forth. The on-line HELP menu offers over fifty screens of topics.

ALLWRITE's superb documentation will get you started quickly. Portions of it are designed for beginners, with every feature clearly explained in step-by-step tutorial style. Since you won't always be a beginner, other parts of the book offer advanced topics. There is a cross-reference summary chapter, a 14-page comprehensive index, and a detailed Table of Contents. We've been developing computer programs and manuals for over 23 years, and understand the importance of good documentation.

ALLWRITE works with all major DOS's on Models 1, 3, and 4/4P.

PROSOFT'S On-Going Customer Support

Perhaps the best reason of all for having ALLWRITE is the continuing support we offer you: friendly, expert, direct support that is unsurpassed in the micro-computer industry.

Note to students: with its Footnote, Table of Contents and Index features, ALLWRITE is ideal for your reports and Term papers.

Note to teachers: ALLWRITE makes it very easy to generate multiple-choice exams and answer keys. Ask for free instructions when ordering.

"ALLWRITE is a professional system that sets a new standard in word processing. It's powerful and easy to learn and use."

80 MICRO, Nov., 1984

Customer Comments

"This is the best software package I have ever received . . . superb, easy to use, fast, and has more features than the business word-processor at the office."

(E.R.L.)

"Your company and products have to be one of the strongest factors I can think of for keeping me with the TRS-80!"

(J.R.H.)

"NEWSCRIP is the Cadillac of word processors. ALLWRITE is the Mercedes Benz!"

(B.E.)

"... a very readable manual."

(D.S.)

BENEFITS OF OWNING

★ ★ ALLWRITE ★ ★

If Word Processing is important to you, PROSOFT's ALLWRITE is the best choice you can make. The clean, professional appearance it adds to your letters and reports will make an excellent impression on people. We will be happy to send you free print samples so that you can see for yourself how good ALLWRITE will make you look.

You probably know that quality word processors for CP/M and the IBM-PC sell for \$300-500, and they don't have ALLWRITE's capabilities or speed . . . or PROSOFT's proven, on-going support. Now, for a fraction of the cost of a new computer, you can have the most complete word processor of all. And you won't have the headaches of starting all over again with a new, different computer.

HUNDREDS OF USEFUL CAPABILITIES

ALLWRITE comes with just about every useful word processing feature . . . standard. Here are some highlights: excellent right-justified proportional printing on most printers having that ability; powerful Form Letter and Mailing Label preparation; Instant counts of words, characters, lines, changes; block Move, Copy, Delete, Putfile, Getfile, and List; delete by character, word, line, sentence, paragraph, or block; insert and one-key insert; great RS-232 printer support; accepts all 256 ASCII codes from keyboard; intermix pitches on same line (printer-dependent); 1.5 line spacing, 6, 7, 8, 12 lines per inch (printer-dependent); does multiple-columns on all printers; perfect alignment of hanging indents; variables, logic statements, conditional printing; wildcard Directories; integrated with Electric Webster and DOTWRITER for Models I, III, and 4 (these are sold separately); "Legal" line numbering; paragraph, list, and figure numbering; supports most popular printers (all "printer drivers" included); compatible with high-memory drivers; fully explains all DOS and ALLWRITE error messages; wildcard search-replace; tabs, search-replace, other settings remembered across files; word reversal; up to nine levels of boldface; flexible page titles; footnotes at bottom of page or end of document; Table of Contents and Index generation; and PROSOFT's unmatched text formatting and printing capabilities.

How To Order

You can order by phone or mail. For quickest delivery, call our Technical Support line. Please specify your TRS-80 model (I, III, or 4, 48K, at least two disk drives), and your printer(s). Our price includes normal shipping in the U.S. and Canada. The sooner you order, the sooner you will begin to benefit from the ALLWRITE! Word Processor.

Allwrite for the TRS-80

\$199.95

Circle 30 on Reader Service card.

ORDER NOW, TOLL-FREE

(800) 824-7888, oper. 422

PROSOFT®

Box 560, No. Hollywood, CA 91603

(818) 764-3131 for Technical Information and Same-Day Processing.

Terms: VISA, MasterCard, checks, C.O.D. California residents please add sales tax. Most orders filled within one day.

Disenchanted With DeskMate

Frankly, I find it just about incomprehensible that any reviewer who had really tried out DeskMate 1.0 could give it a four-star rating (May 1985, p. 31). I bought a Tandy 1000 with 256K of RAM, naturally figuring I could write to a drive-B disk with DeskMate in drive A. This turned out to be impossible, and nobody warned me about the problem.

Since DeskMate is more than 300K large, the only acceptable way to use it is to delete just about everything from the program except the part you're using. Following the instructions in the manual, I tried to get DeskMate and MS-DOS on the same disk, but this, too, turned out to be impossible. Your reviewer, Bradford N. Dixon, didn't mention any of this.

As for the four-star rating in the category "Bug free," you must be kidding. DeskMate 1.0 has more bugs than you can shake a stick at. To mention just one: Changing a file was impossible, with the program merrily jumping between the old and new names ad infinitum.

If "taken together, DeskMate's documentation is the best (your reviewer has ever) seen for any Tandy program," then I shudder to think what the others must have been like. I doubt that the documentation writer clearly addressed himself to the problem of the knowledge level of the intended reader.

In justice to Tandy, I should mention that the revised version (1.1) does. Insofar as I have tested it, appear to contain the improvements that you listed under "Late-Breaking News."

I deem it inappropriate to criticize any program for the in- or exclusion of features it wasn't designed for. The real question is how well the programmers of version 1.1 have accomplished the goals they set for themselves and how DeskMate compares with other integrated programs of equal length.

Ralf F. Munster
Decatur, GA

I stand by my rating. Yes, DeskMate is a long program, but Tandy's instructions for putting it on a bootable disk are simple and they do work. Put an MS-DOS system disk in drive A, a blank disk in drive B, and type in `FORMAT B: /S`. When the format is complete, put your DeskMate master in drive A and



type in `COPY *.* B:`. Granted, you have only about 12K of disk space left, but you can use drive B to store files, simply by specifying that drive when you type in a file name. I find no bug when changing a file name.

The documentation is explicit and complete. The tutorial booklet guides the first-time computer user, the DeskMate Reference Manual gives further explanations of commands, and the Quick Reference Guide answers the occasional question a seasoned user might have. What more could you ask?

—Bradford N. Dixon

His

Congratulations for your stand against the onslaught of lib lingo (Input, June 1985, p. 12). Male pronouns have been used generically for hundreds of years. Nevertheless, on p. 22 of the same issue, you permit "he or she."

Robert N. Pinkerton
San Antonio, TX

Hers

Your response to Betty Burnett's letter regarding the use of "he" versus "she" ended with the sentence, "Fortunately, people generally understand that

this is a term of convenience rather than a purposeful bias." This is, unfortunately, wrong. The problem goes beyond trying to avoid being sexist, verbose, or grammatically incorrect.

The use of the male pronoun in writing is a product of, and still very much a part of, our society's history of sex stereotyping. Most people, when reading about doctors, lawyers, or programmers, will do a double take when they come across "she" or "her." This is because it clashes with the mental images they are programmed to invoke when thinking about these vocations. Use of the male pronoun has the insidious effect of shaping expectations. If we do not question it, we will carry sex stereotypes into the next generation.

I admit that 80 Micro does better than many magazines in dealing with sex stereotypes. Most of your articles speak directly to the reader, using "you" or plurals. And longtime readers will surely remember that Mercedes, the computer whizchild in the Gamer's Cafe, was female.

This does make it curious that you balked when the question arose. I would suggest that the creative editor should be able to get around the difficulties you mentioned. Or perhaps, better still, go ahead and use "she" (in every other article?). Make a point; shake up our mental images.

Deborah Crocker
Charlottesville, VA

Volks Remedy

In his review of Volkswriter Deluxe in the May 1985 issue (p. 110), John B. Harrell III observes that the Tandy 2000 Volkswriter does not support any non-Tandy printers and that the Tandy 1000/1200 version of Volkswriter does not support any Tandy printers. To take care of this, Lifetree Software's customer service department will supply the additional printer drivers at no charge to any Tandy dealer who requests them.

Regarding the problems Harrell noted with MS-DOS 2.22, it appears that changes in the new RAM BIOS (Basic input/output system) are affecting the video display on the Tandy 2000. We are investigating the problem and hope to resolve it soon.

Vicky L. Boddle
Lifetree Software Inc.
Monterey, CA

80 Micro's BBS is open 24 hours a day. It offers programs you can up- and download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1200 baud, 8-bit words, 1 stop bit, no parity.

Check these features:

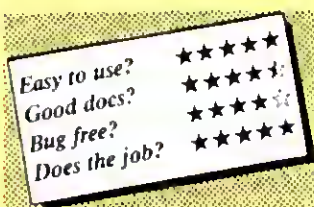
Talker 2.0 and Talker 4.0 software:

- ✓ Unlimited translation of English text to clear speech.
- ✓ Powerful video or keyboard echo can be switched on or off at any time.
- ✓ Can be used in BASIC with 2 new commands: PRINT* "I can talk" speaks any expression. PRINT! "Hello" speaks and prints on screen.
- ✓ Reads numbers up to 999 trillion.
- ✓ Speaks many abbreviations, such as Mrs., Mr., lb., oz., Co., etc.
- Walks the dog.
- ✓ Many control codes to tailor the system to your wishes. (Pitch, speed, etc.)
- ✓ Only 6¼K long.
- ✓ Talker relocates itself into available high memory. Compatible with any DOS(not CPM).

The VS-100 hardware:

- ✓ Same performance as very expensive units.
- ✓ Super efficient: About 50 bytes per sentence.
- ✓ Handsome speaker module included.
- ✓ Detailed 48 page manual.
- ✓ Ready to plug in and talk right away.
- ✓ Uses the famous Votrax SC-01 with 4 pitch levels and automatic inflection.
- ✓ Built in audio amplifier with volume control.

See the detailed review in 80-Micro December 1984.



SPEECH

fun
simple
powerful

with the vs-100 voice synthesizer



The VS-100 system. (Model I shown)

\$ **69⁹⁵**

Includes
- VS-100 synthesizer
- Speaker
- Power supply
- Manual

Specify Model I, III, 4 or 4P.

Model 4P needs short 50 pin extension cable 14.95

TEXT-TO-SPEECH SOFTWARE

- **Talker 2.0** for Models I and III
On disk only..... 29.95
- **Talker 4.0** for Model 4. Includes Talker 2.0 for Model III mode. On disk only..... 39.95
- Text-to-Speech for tape users 19.95

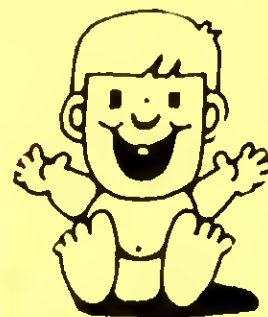
Small Print: ● Model I: unit plugs into keyboard or expansion interface 40 pin bus ● Model III, 4, 4P: unit plugs into 50-pin I/O bus. Model III VS-100 works with Model III, 4, 4P. Use our "Y-cables" (see next page) if your bus is already used

The VS-100: You've *never* had so much *fun* with your TRS-80

"Doctor SIGMUND"
will amaze you!

See Artificial Intelligence at work!

If you want to show off your computer, run "Doctor SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you. If you have a VS-100 voice synthesizer, Sigmund actually talks back to you. Even YOU will be impressed. **\$29.95**
Doctor SIGMUND, for Models I, III and 4 (48 K required), available on disk only



Circle 17 on Reader Service card

ALPHA Products

79-04 Jamaica Ave., Woodhaven, NY 11421

(718) 296-5916

Toll Free Order Line

800-221-0916

Orders Only, NY & info call

(718) 296-5916

Hours 9-5 Eastern Standard Time

Add \$3.00 per order for shipping/handling.
We accept Visa, Mastercard, Checks, M.O.
C.O.D. Add \$3.00 extra
N.Y. Residents add sales tax
Overseas, F.P.O. A.P.O. Add 10%
Dealer discounts available



Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q: Your answer to Brian Voth's letter in the February 1985 issue (p. 18) regarding an address for Progressive Computer Products was incorrect. That company still exists; however, they're doing business as Micro Mainframe and their address is 11325-E Sunrise Gold Circle, Rancho Cordova, CA 95670.

They no longer directly sell products for the Model III or 4. They do manufacture the controller board that Brian Voth asked about. We at IJK Inc. sell the board as part of our upgrade kits. Micro Mainframe also manufactures floppy and hard disk controller boards for the IBM PC and compatibles including the Tandy 1000 and 1200. (William O. Jellerson, IJK Inc., Maple Valley, WA)

A: Thank you for writing.

Q: I bought a TRSDOS 6 Training course from Radio Shack. Every time I try to run it on my Model 4P, I get a disk error. The disk works fine on a Model 4. What's wrong? (Edward Hitchens, Pufalluf, WA)

A: Something is wrong with your copy of the program. The training course is supposed to work on both the Model 4 and the Model 4P.

Q: Regarding Chris Candreva's question about using TRSDOS 1.3 with 80-track disk operation: While TRSDOS 1.3 is bug-free and simple to use, extensive modifications such as hard disk drivers and double-sided floppy disk drivers are really not worth it, considering the availability of good and reasonably priced operating systems such as LDOS, DOSPLUS, and NEWDOS/80. However, since Model IIIs and 4's in Denmark come with 80-track single-sided drives as the norm, I have an 80-track version of TRSDOS 1.3.

I'll be happy to send a copy to any interested reader if he or she sends proof of ownership, like an original disk or a photocopy of the Tandy Registration form, and \$5 to cover expenses.



Also specify your drives' stepping rate, if you know it, so I can send the system best suited to your drives. I want to emphasize that this is a single-sided version. In fact, if anyone has modified TRSDOS for double-sided operation, I would be interested in hearing from them. (Niels-Jorgen Biergstrom, E-C Data A/S, Tornevangsvej 88, P.O.B. 116, DK-3460 Birkerød, Denmark)

A: Thanks for writing and making your generous offer.

Q: In the May 1985 Feedback Loop (p. 16) you told Carlos Matos he wouldn't be able to find a book about Model I double-density operation. The first chapter of the TAS Programmer's Journal #19 is titled "Everything You Ever Wanted to Know About Model I Doublers," by Paul Snively. And it does just what the title says, if you have the technical savvy to follow along with it. Otherwise it gives you the routines on disk so you can "cookbook" it. The book is available from The Alternate Source, 704 North Pennsylvania Ave., Lansing, MI, 48906.

As for Matos' other questions: NEWDOS/80 1.0 should boot up fine with the doubler in place. I do it all the time. Obviously you'll still be working in single-density, because that's all that 1.0 supports. Matos said NEWDOS/80 V1.0 wouldn't load. Obviously, you can't use TRSDOS 2.8 to load another DOS over itself.

His problem with Edit/CMD is not with the doubler; it's with TRSDOS 2.8. This DOS is incompatible with almost all

/CMD programs, even Radio Shack's own! I suggest getting NEWDOS/80 2.0 as your double-density DOS. It comes with the necessary zaps to make Edit/CMD run correctly in double-density format. (Phil Holden, Richardson, TX)

A: I think I can be forgiven for not knowing about that one, since the TAS series had a limited circulation.

Q: I have some information that may help James Patterson, who wanted to use Scripsit with Japanese characters (May 1985, p. 17). Radio Shack's LP-VI printer can print the Japanese Kata Kana alphabet as characters 160-223. To make the printer do this, remove the printer case and find the small slide switch (SW1) in the middle of the printed circuit board beneath the platen. Move the switch from "A" to "J." Reassemble the printer and use a word processor to print the characters from 160-223. By the way, if you want an up-arrow instead of a bracket on your printouts, close DIP switch number 4 to select Radio Shack's codes for CHR\$(91) to CHR\$(95). (Ed Haynes, Napa, CA)

A: I didn't know the LP-VI could do that; thanks for the info.

Q: I'd like to use two 1-megabyte 3½-inch drives as a sort of poor man's hard disk system on my Model 4. Will the TRSDOS 6.2 Device command recognize and properly configure the DOS to let me use them as external drives 2 and 3? The manual doesn't state any limits for disk size or number of cylinders. These parameters are significantly different between 3½-inch and 5¼-inch drives.

Granted, with 20-50 megabyte hard disk drives available, a meager 2 megabytes isn't all that much. But it sure is cost effective (about \$300 for two drives, case, and power supply) and requires no extra hardware (hard disk controller/interface) or software! (Earles L. McCaul, Tucson, AZ)

A: The only requirement for the 3½-inch drives is that they follow the Shugart drive standard (the Shugart drive connector is the standard for drives just as the Centronics printer connector is the standard for printers). That is, they must be plug-compatible with

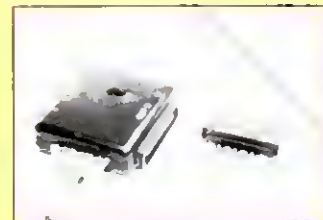
Newclock-80 \$69.95

The right time at the right price! Keep the time and date with quartz accuracy, even when your computer is off. The backup lithium battery (included) will last for over 2 years. Software on tape or disk, please specify. Use "TIMES" once to set the clock. Use "SETCLK" to set your computer's internal clock (at power up) or use "TSTRING" so that the "TIMES" function reads the Newclock. Connection: Model I: plugs into the keyboard or expansion interface. Model III: plugs into the 50-pin I/O bus. Compatible with all operating systems.



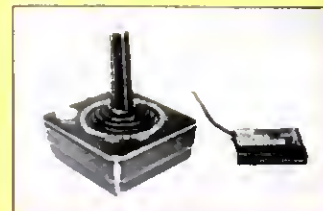
Printswitch \$59.00

Do you have 2 printers? Get a Printswitch. Stop plugging and unplugging those printer cables. With the Printswitch, you can have 2 printers connected to your computer and you can select either one at the flick of a switch. Works with any printer, plotter, or device that uses the parallel printer port. Simply plug the 14 inch Printswitch cable into your computer, and plug your existing printer cables into the Printswitch. This is the nicest unit on the market. Superior quality board with gold plated edge connectors. For Models I, III, 4 and 4P



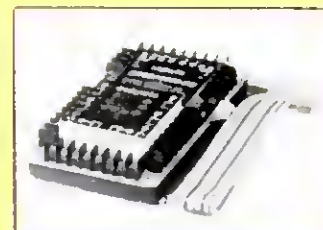
Alpha Joystick \$27.95

When it's time for fun, don't be without your Alpha Joystick. Do you know that most action games are Joystick compatible? Stop pounding on your keyboard and enjoy real arcade control. The joystick can also be used with BASIC programs; simply do J=INP(0) to read the joystick position (8 directions and fire button). Model I: plugs into keyboard or expansion interface. Model III, 4 and 4P: plugs into 50-pin I/O bus. The Alpha Joystick comes fully assembled and tested, ready to plug in and enjoy. (Specify Model I, or Model III, 4).



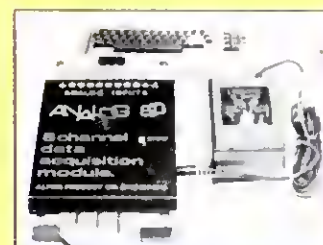
Interfacer-80 \$159.00

Low cost input and output device. The outputs consist of 8 relays (rated 2 Amp @ 125V), easily controlled using "OUT" commands. For example, OUT 0.0 turns all the relays off. Eight LED's show the states of the relays. The 8 inputs are optically isolated, so it's safe and easy to connect external devices (switches, sensors, thermostats, etc.). Simple "INP" commands read the inputs. Connection: Mod I: 40 pin bus. Mod III, 4, 4P: requires 50-pin I/O bus converter (\$39.95) plugs into 50-pin I/O bus. Comes complete with power supply, cable, and detailed manual. (Up to 8 interfacers can be connected to your TRS-80 using our Y-cables).



Analog-80 \$139.00

8 channel 8 bit Analog to Digital converter. Your TRS-80 can read voltages, temperatures, pressures, light levels, etc. • Input range: 0 to 5.1 Volts. • Resolution: 20mV. • Conversion time: 120 microseconds. In BASIC, you can take up to 100 readings per second. • Port address: selectable. Up to 8 Analog-80's can be connected to your TRS-80 for a total of 64 channels! Connection: Model I: 40 pin I/O bus. Model III, 4, 4P: requires 50-pin bus adapter (\$39.95). Comes complete with power supply, cable, and manual.



Special Cables

Disk drive extender cable (8'')...C160:\$9.95

Y-Cable for Mod I bus (40 pin): • X2-40...\$29 • X3-40...\$44 • X4...\$59 • X5...\$74

Y-Cable for Mod 3 & 4 bus (50-pin): • X2-50...\$34 • X3-50...\$49 • X4-50...\$64

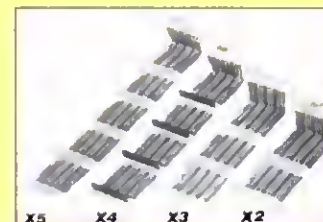
Disk drive cable (34 pin): • 2-drive...C162:\$32 • 4-drive...C163:\$45

Extension cable, 4 foot: • For printer and drive (34-pin)...C165:\$22

• For Mod I bus (40-pin)...C167:\$24 • For Mod 3 & 4 bus (50-pin)...C169:\$28

Keyboard to E/I (40-pin, 8'')...C161:\$21 If this is confusing, send for our Cable Flyer

Our cables are made with high quality gold plated connectors to ensure utmost reliability



NO RISK

We know that ordering by mail can sometimes be a hassle, but with Alpha, you are fully protected

1) Our 15 day money back guarantee protects you from disappointment

2) All our products are tested on a TRS-80 and warranted to 90 days (parts & labor)

3) We ship 90% of our orders within 24 hours.

4) We are committed to help you

Green Screen \$12.50

Do your eyes a favor, put on a green screen. Tens of thousands are in use for a good reason: they work. Contrast is enhanced and eye fatigue is greatly reduced. Our green screen is curved; it fits right on the face of the tube. (Fits Models I, II, III, 4, 12, 16)



Circle 17 on Reader Service card

ALPHA Products
79-04 Jamaica Ave., Woodhaven, NY 11421
(718) 296-5916

Toll Free Order Line

800-221-0916

Orders Only, NY & Info call

(718) 296-5916

Hours: 9-5 Eastern Standard Time

Add \$3.00 Per Order For Shipping And Handling. We Accept Visa Mastercard Checks M.O.C.O.D. Add Sales Tax Overseas FPO APO, Add 10% Dealer Discounts Available. C.O.D. add \$3.00 extra

standard 5¼-inch drives. The problem is that I can't find anyone who currently has a mixed set of drives to verify my information, so I can't say for sure if the naked drives are compatible or if the case and power supply for the 3½-inch units contain an adapter for the Shugart drive standard.

In any event, if you get a 3½-inch drive, make sure you also get the technical manual for it so you can configure the drives properly as external drives 1 and 2. If you decide to use a Radio Shack keyed cable (the connector for drive zero doesn't have the teeth for drives 1, 2, or 3 and the connector for drive 1 doesn't have the teeth for drives zero, 2, or 3), then you must make sure that you don't have the 3½-inch drives configured for any particular position. Once you have the drives installed, you just have to tell the DOS the drive specifications.

Q: I heard from an IBM service engineer that their programs that use the Basic ROM will run on compatibles (like the Tandy 1000) if you have Basic on the disk. Is this true?

Also, do you know of any Basic programs that rotate pictures in a circle on the Tandy 1000's screen? I'm trying to work up an animation sequence and this is the only piece missing. (Charles N. Ezzell, Rocky Mount, NC)

A: When you are using disk Basic on the IBM, the computer ignores ROM Basic. Since Tandy sells the same version of Basic that comes with the IBM PC, you can move programs between the two computers without trouble. As yet, I haven't run across any programs for rotating pictures in IBM Basic.

Q: I bought a Shugart-compatible Digital RX180AB double-density floppy disk system, which comprises two 5¼-inch floppies and power supply. I want to interface it to a 48K Model I with Expansion Interface. Can you tell me how? (Ray Olson, Rockford, IL)

A: You've got two possible solutions, depending on how much work you want to do. First and simplest, buy a Radio Shack Model I drive cable, remove the DB-25 connector at the rear of your DEC RX180AB, run the cable through the slot, remove the internal drive cable of the RX180AB, and plug in the Radio Shack cable. That's it. The RX180AB's drives are standard and have a Shugart-compatible connector. DEC just uses an internal cable to go from the drives (34-conductor) to a DB-25 connector. This prevents customers from using anyone else's drives with DEC computers.

Second, you can make your own drive cable by buying a length of 34-conductor ribbon cable terminated at one end with

a 34-pin edge-card connector and at the other with a DB-25 connector.

For those interested, the RX180AB is a set of standard 40-track drives. John Meshna Jr. Inc. (P.O. Box 62, East Lynn, MA 01904, 617-595-2275) sells them as surplus in original sealed cartons for \$250.

Q: In your June 1985 column (p. 17), you tell Yulee Johns how to use the Device and SYSGEN commands to permanently enable drives 2 and 3. But the SYSGEN routine only adds to the boot-up time and does not appear on disk back-ups.

Here are two patches that will do the same thing. To install the patch for drive 2, at TRSDOS Ready type in PATCH BOOT/SYS.LSIDOS:0 and press the break key. Then type in (D02.84 = C3:F02.84 = C9) and press the enter key. To install the patch for drive 3, type in PATCH BOOT/SYS.LSIDOS:0 and press the break key; then type in (D02.8E = C3:F02.8E = C9) and press the enter key. (Richard F. Krak, Clifton, NJ)

A: Thanks for the assistance.

Q: I use SuperScript on my Model 4P, and the blinking cursor is driving me crazy. Trying to read what I've just typed with the cursor blinking is like listening to water dripping in the sink. Do you or any of your readers know of a patch? (Steven A. Melnick, Williamantic, CT)

A: I haven't seen such a patch yet; has anyone else?

Q: We recently equipped our classrooms with Model 4's (networked) and the faculty offices with Model 4Ps. We're using SuperScript but, because it's sometimes cumbersome, we wonder if you recommend any other word processing programs. (Manny Paraschos, Department of Journalism, University of Arkansas at Little Rock, Little Rock, AR)

A: You'll find three premium word processors for the Model 4/4P: Lazy Writer (Alphabit Communications, 13349 Michigan Ave., Dearborn, MI 48126, 313-581-2896), LeScript (Anitek, P.O. Box 361136, Melbourne, FL 32936, 305-259-9397), and Allwrite (Prosoft, Box 560, North Hollywood, CA 91603, 818-764-3131). Each has its own strengths.

Capsulizing them would take too much space, so the best I can do is refer you to past reviews: Allwrite in November 1984 (p. 35), LeScript in April 1984 (p. 33), and Lazy Writer in September 1982 (p. 102). The September issue includes an overview of the Model I/III

word processing software available at that time. Back issues can be ordered from the Back Issue Order Department, 80 Pine St., Peterborough, NH 03458. (See also our feature on Model 4 word processors planned for the November issue—Eds.)

I prefer Allwrite because it gives me certain features I need, such as automatic tables of contents and indexes and proportional printer spacing support.

Q: I have a 16K Model 4 that I upgraded to 64K and Percom Data drives, and have been having a problem with Micro-Systems Software's DOS-PLUS 3.4. When I run Diskzap to copy disks, I sometimes get a "CRC error during read" message. I called Micro-Systems and they said, "Possible head troubles." I called Percom Data and they said, "Cleaning too much will possibly cause head problems."

I got Radio Shack's Disk Drive Analyzer and passed all tests but the write/read test. I don't understand why I can't pass this test but don't get any errors when using all the DOS's functions under normal programming and running. I can copy from drive to drive, use disks formatted on other Model IIIs, and use my disks in other Model IIIs.

My question is twofold: Is there really a problem with my drives, and does the Disk Drive Analyzer have a problem with the read/write portion with different drives? (George M. Crews, Gurley, NE)

A: It's possible, but not likely, that the problem is with your drives. First, what kind of disks are you using? A single-density disk in double-density mode will cause a heavy and fast build-up of garbage on the drive head. And the brand of double-density disks makes a difference, too. The coating on the diskette surface varies from manufacturer to manufacturer. Some are very hard and some are very soft. The softer coatings break down and flake off more quickly, with a resulting build-up of trash on the drive head.

Cleaning your drive heads daily or weekly will definitely wear the heads down faster than normal (all cleaning disks are slightly abrasive, some more than others). In a perfect world, the drive heads would never get dirty and never need cleaning, but we all know better. So if you run your drives hard all day long, you should probably clean them once a month. I don't use my drives that hard, and clean them about once every six months to a year, or whenever I start to experience what I think might be head problems (about once a year).

If you must clean your drive heads frequently, use rubbing alcohol and cotton

swabs (Radio Shack sells cotton swabs on 6-inch sticks, long enough to reach the drive head from the drive door without disassembling the case).

Second, have you ever had your disk drives aligned and tested? If the drive head's azimuth or track-to-track centering is somewhat off, you could get intermittent problems like you describe. Another possibility is the drive motor. If it isn't running at a steady pace, you could have problems. Few motors stay exactly on the 300 revolutions per minute that drives are supposed to maintain; a slight drift outside the normal 2 percent variation range will cause CRC problems. Older drives might need their drive belts replaced (the old ones are probably loose and slipping).

Third, the problem could be your drive controller board. An excellent tutorial on disk drive maintenance, "Drive Ways," is on p. 42 of the September 1984 *80 Micro*.

I haven't heard of any problems with the Radio Shack Disk Drive Analyzer, but if the stepping rate used in the tests is faster than the drives can handle, you would get the results you report.

Q: The Model I has a beautiful feature that lets you trace the number of lines your printer has printed at any time. I can easily print what I want at the line where I want it simply by programming a subroutine after every print sequence (see the Program Listing).

I can't locate anything that will do the same on the 4P. FFHARD in the *PR filter or the SYSTEM "TOF" gives me a top-of-form (TOF), but that's not what I want. I must be able to count the lines printed and determine where my next section of print will go without a top-of-form interrupting it because a TOF will destroy the continuation of my output format. I also want to signal my program when a TOF has occurred, so I can print my new page heading related to the next subject. (Frans de Jong, Chief Surveyor, PRC Engineering Inc., East Hartford, CT)

A: You can find the number of lines sent to the printer, but only if you've installed the Forms printer filter/driver. TRSDOS 6.X.X doesn't know or care how many lines the computer has sent, but the printer filter does. You need

to find the printer filter in memory and count from its beginning to the location where it stores the Lines Printed value. With this information, you can have your program PEEK that location whenever needed. The problem is in finding where the DOS has installed the filter.

You have to use *GETMOD to get this information, preferably before you go into Basic. The TRSDOS 6.X.X *Technical Reference Manual* provides the instructions, as well as the information on the relative location of the Lines Printed value in the printer filter/driver. Good luck.

Q: W.B. Mair's question in April (p. 14) about using each side of a double-sided drive independently is timely. In light of the commentary by Powersoft in the August 1984 issue (p. 27) about using hard disk platters the same way. My system uses double-sided drives as two independent units and I must report excellent success.

The solution proved simple. No special programming, no trace cutting; just plug it in. A switch and a diode are all you need for each drive. Alternately, a single switch and diode will select the back side of all drives in the system at the same time.

The drive select gates are as follows: drive zero equals pin 10, drive 1 equals pin 12, and drive 2 equals pin 14.

These pins are on the circuit board of both the disk drive and the computer and are maintained at +5 volts when the drive is unused. When the computer selects the drive for disk input/output, it connects one of these pins to signal ground and activates that drive. Signal ground pins all have odd-numbered lines and signal select pins all have even numbers.

The side-1 select gate is on pin 32, maintained at +5 volts until the computer wants to write to the reverse side of the disk, when it is switched to signal ground. The trick is to connect signal ground to pin 32 (side-1 select) at the proper time. A simple switch will do. When you connect pin 32 to signal ground (one of the odd pins, preferably pin 31), all drives will select side 1 all the time. But if you have more than one drive in the system and want to selectively use side 1 of any drive, you need a

switch for each, and must selectively connect pin 32 (side-1 select) to one of the drive select pins (10, 12, or 14).

For this reason, you use a switching diode to isolate the drive select signals from each other, or else all drives switched to select side 1 would activate simultaneously. You connect the cathode of the diode to the drive select pin (10, 12, or 14), and the anode to the switch. You connect the other pole of the switch to pin 32, one for each drive you want to switch. When the computer selects a specific drive and the switch is closed, the gate at the drive select pin will go to signal ground, clamping pin 32 to signal ground also and giving you side one instead of side zero.

Some words of caution:

You must use a germanium switching type diode. A silicon diode tends to drop too much voltage across its junction. Radio Shack offers 1N34A germanium diodes and small mini- or micro-toggle switches (and small utility boxes to house them).

The easiest way to make these connections is by inserting an extender cable with two male connectors on one end and one female on the other between your computer and drive cable. One of the male connectors goes to the drive cable, the other to your switch box.

This works well with my favorite DOS, DOSPLUS 3.4D. In double-sided double-density operation, this DOS treats the back side of a disk as an extension of the front side and only has a directory entry on side zero. When limiting the number of directory entries while expanding available data space, you can run out of directory space before you fill the disk. When you can select each side independently, you can call directories for both sides. To change to another DOS, flick the switch to normal operation.

You can use the same technique to write-protect any or all disks in the system without fussing with tabs on disk covers. By using a switch with a center-off position, you can write-protect drive zero, drive 1, or none through the hardware. (Bob Harvey, Medford, NJ)

A: As you can see, folks, you can use double-sided drives as two drives each, but it does require a bit of hardware work. By using a separate box to control the switching, you won't have to worry about ruining your drives, because all the switching happens before the signals arrive at your drives. ■

Terry Kepner is a freelance writer and programmer, and an associate editor of 80 Micro. He writes monthly columns for Portable 100 Magazine, Hot CoCo, and Under Color. He's been writing about microcomputers since 1979.

```
10000 REM LP=Line Printed, LN=Line Next
10010 LP=PEEK(16425)
10020 FOR J=LP TO LN:LPRINT":NEXT J
10030 LI=INT(LN/10):LN=((INT(LI))+1)*10
10040 IF LN<50 RETURN
10050 LP=PEEK(16425)
10060 FOR J=LP TO 60:LPRINT":NEXT J
10070 LPRINT"(bottom title)":LPRINT CHR$(12):POKE 16425,0:RETURN
```

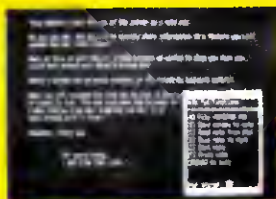
Program Listing. Subroutine to trace number of lines printed.



MONTEZUMA MICRO

PRESENTS MONTE'S WINDOW™

NOTEPAD



**WINDOWS ON
YOUR MODEL 4!**



CALENDAR



**TAKES NO
USER RAM!**



REQUIREMENTS

Montezuma Micro CP/M®
2.2 version 2.21+
128K RAM
Model 4 or 4P
8-bit Fever

CALCULATOR

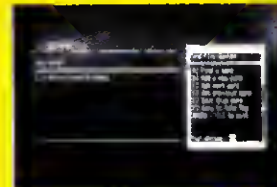


Pop Up Menus!

\$49

Easy to Use!

INDEX
CARD FILE



A touch of the keyboard opens a window in your screen for—a Note Pad, an Appointment Calendar, a Calculator, even a Mini Data Base. All yours for just \$49! Need RAM? Monte's Christmas gift to you — 64K and the window, both for \$99!

Once Upon A Time,

Monte Zuma, our Founder, President and King, has always had trouble keeping his desk organized. The Sidekick™ from Borland International would solve the problem, but alas, it was not available for CP/M®. So Monte asked his favorite nephew, the legendary LaMont E. Zuma (distant cousin to Rondo Talbot, a direct descendant of Monte Zuma himself) to work on the problem as best he could during recess at the home. LaMont, a true legend in his own time, really outdid himself this time. A touch of both shift keys halts your application program in its tracks and up pops **Monte's Window™** ready to use. What could be simpler? Put an end to the fumbling and pawing around the pile of papers on your desk. You will find **Monte's Window™** indispensable. When you are finished, break back to your application program and it resumes without error. **Monte's Window™** is truly a breakthrough. See for yourself—Look through **Monte's Window™** on your Model 4. How did you ever get along without it? See the page opposite for order information. **Monte's Window™** is available right now.

CP/M....The Software Key That Unlocks Your Model 4

CP/M is the standard 8-bit Z-80 operating system and many thousands of programs have been written to run under this system. With Montezuma Micro's CP/M you can run these programs on your Model 4/4P. Think about all those nationally known programs you've wanted to use. Programs like WordStar, dBASE II, SuperCalc, MultiPlan etc. With our version of CP/M 2.2 all those public domain programs on bulletin boards across the USA are available for free downloading. CP/M is the missing link that joins all this software to your Model 4/4P. Montezuma Micro's CP/M comes ready to use and requires no hardware modifications. This product has been awarded the best and highest ratings in the reviews and we are continuously improving it with you in mind. With our CP/M you get more than just a DOS. You get the other half of your Model 4/4P.

AVAILABLE NOW FOR IMMEDIATE SHIPMENT - Less Hard Disk Drive Support.....\$169
Optional Hard Disk Drive Support\$ 30

(Radio Shack 5M, 12M, 15M, 35M • Aerocomp/Percom 5M, 10M, 15M, 30M • Bi-Tech 5M, 10M, 11M, 15M, 20M, 30M, 40M)

FEATURES

- Full range of floppy drive support. Dual-head and/or 80 tracks.
- Optional hard disk support allows positioning and selective assignment of logical drives. Easy backup routine.
- Memory drive allows the use of the other 64K RAM bank on 128K machines.
- Modem 7, a powerful public domain communications program furnished at no charge, allows for file transfer and remote database access such as CompuServ and The Source.
- CONFIG is our flexible utility that allows complete control of all operating parameters from menus. Format, read and write more than 30 different manufacturer's disk formats with more being added rapidly.
- Disk Utility Program allows fast format, backups and verifying of ours and other manufacturer's disks.
- These CP/M utilities are included: ASM; DDT; DUMP; ED; LOAD; MOVECPM; PIP; STAT; SUBMIT; SYSGEN; and XSUB.

128K MEMORY UPGRADE

Our upgrade kit includes 64K RAM, a genuine PAL chip and instructions for installation. This kit will upgrade your 64K Model 4 to 128K and allow the use of our MEMLINK program and the TRSDOS 6.x MEMDISK. Guaranteed 1 year.

A BARGAIN AT ONLY \$74 Model 4
\$64 Model 4P - No PAL

WHY BUY OURS?

	MONTENZUMA MICRO	RADIO SHACK
Transient Program Area (TPA)	SSK	52K
Bytes free in MBASIC	30,778	18,488
Bytes free of formatted disk	196K	160K
64K Memory drive	YES	NO
Double-Side/80tk drive support	YES	NO
Format, read/write other		
CP/M formats	YES	NO
Communication program included	YES	NO
Share HD with TRSDOS/LDOS	YES	NO
Assign multiple drives to HD	YES	NO
Boots from Hard Disk (4P)	YES	NO
Popular terminal emulation	YES	NO
User defined function keys	9	3
Timely product support	YES	NO

This popular software is available for the Model 4/4P using our CP/M.

WordStar Fast memory-mapped version 3.3 \$250
MailMerge Multi-purpose file merging program ... 125
SpellStar 20,000 word proof-reader on a stick ... 125
StarIndex Creates indices and Tables of Content... 85
DataStar Data entry and retrieval is yours 175
ReportStar Report generator and file manipulator... 150
InfoStar The above two programs 300
dBASE II with Disk Tutorial..... 385
CBASIC version 2.8 85
TURBO PASCAL by Borland. This is the one..... 45

ORDER INFORMATION

Call now and your order will be shipped immediately. We accept American Express, MasterCard and Visa plus we ship COD (cash or cashier's check only). Credit cards are not charged until your order is shipped. Add \$4 shipping per item on orders within the 48 states. Suitability of the software is the responsibility of the purchaser as there are **NO REFUNDS**. Defective items will be replaced upon their return, postpaid.

ORDER NOW... TOLL FREE

800-527-0347
800-442-1310

The Toll Free lines are for orders only
 Specifications subject to change without notice

CP/M is a Trademark of Digital Research, Inc. Interchange and Memlink are Trademarks of Montezuma Micro. TRS-80 is a Trademark of the Tandy Corporation. WordStar, MailMerge, SpellStar, StarIndex, InfoStar, ReportStar, DataStar, SuperSort and CalcStar are Trademarks of MicroPro International Corporation. Multiplan is a Trademark of Microsoft.

Copyright Montezuma Micro 1984

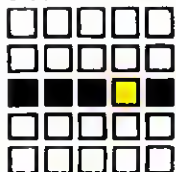


MONTENZUMA MICRO

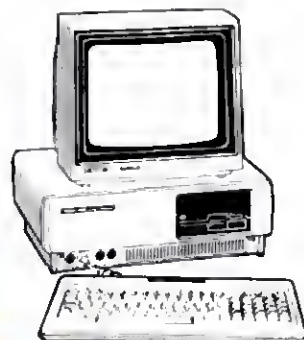
214-339-5104
 Redbird Airport, Hangar #18
 P.O. Box 32027
 Dallas, Tx 75232

"WE KEEP YOU RUNNING"





PERRY COMPUTERS



CALL
1-800-248-3823

COLOR COMPUTERS

	LIST PRICE	OUR PRICE
26-3127 64K Extended Color Computer 2	\$219.95	\$169.00
26-3136 16K Extended Color Computer 2	159.95	130.00
26-3129 Thinline Disk Drive O for Color Comp	349.95	290.00
26-3018 Extended Basic Kit	39.95	36.00
26-3030 OS-9 with Editor Assembler	69.95	59.50
26-3012 Deluxe Joystick	39.95	25.00
26-1208 CCR 81 Recorder	59.95	50.00
VIP Integrated Library	149.95	139.00
VIP Writer	69.95	59.00
VIP Calc	69.95	59.00
Teletwriter Disk		59.00
Botek Interface		57.00

TANDY 2000

26-5103 Tandy 2000 Two Disk	\$2499.00	\$1225.00
26-5104 Tandy 2000 One Disk & 10 Meg HD	3950.00	1885.00
26-5111 Monochrome Monitor	199.95	165.00
26-5112 Color Monitor	649.00	535.00
26-5140 Hi Res Graphic Monochrome Board	359.95	305.00
26-5141 Hi Res Color Graphics Chips	149.95	125.00
26-5160 Internal 128K Memory Board	299.00	250.00
26-5300 Lotus 123	495.00	420.00
26-5311 Microsoft Multiplan	195.00	166.00
26-5320 Framework	695.00	590.00
26-5352 dBase II (Data Base)	595.00	420.00
26-5330 Multimate	249.00	205.00

MODEL 200 COMPUTERS

26-3860 24K Model 200 Portable Comp	\$999.00	\$725.00
26-3866 24K RAM Mem. Exp. Chip for 200	249.95	210.00
26-3804 AC Adaptor	5.95	5.00
26-3805 Acoustic Coupler	39.95	34.00
26-3816 8K RAM Memory Expansion Chip	119.95	95.00
26-1409 Printer Cable	14.95	12.70
26-1410 Modem Cable	19.95	17.00
26-3809 Briefcase	49.95	42.50
26-3811 Soft Carrying Case for 100/200	39.95	34.00
26-1183 Bar Code Reader	99.95	85.00
26-3806 Disk Video Interface	799.00	660.00
26-3829 Multiplan ROM for 100	149.95	127.50

MODEL 4 COMPUTERS

26-1069 Model 4 64K 2 Drive Computer	\$1299.00	\$ 945.00
26-1126 Mod 4 H1 Resolution Board	249.95	210.00
26-1122 64K Memory Expansion	79.95	75.00
26-1127 Model 4 Internal Drive 1	499.95	415.00
26-1123 Model 3 to Model 4 Upgrade Kit	799.00	675.00
26-1084 Model 4P Modem Board	149.00	85.00
26-1085 Model 4P Travel Case	24.95	21.25
26-1530 Multiplan Model 4	199.00	169.00
26-1595 Super Script Model 4	199.95	169.00
26-1635 Profile 4 Model 4	249.95	212.00
26-2216 CP/M Plus Model 4	149.00	127.00
26-2231 Double Duty Utility	69.95	58.00

MODEL 12 & 6000 COMPUTERS

26-4005 Model 12 80K 2 Drive Computer	\$3999.00	\$1300.00
26-6021 Model 6000 512K 2 Drive Comp	4499.00	3125.00
26-6022 Model 6000 512K 15Meg HD	5499.00	3795.00
26-6014 Model 12 to 6000 Upgrade	1595.00	1325.00
26-6015 Model 6000 512K Memory Board	1095.00	905.00
26-6016 Model 6000 512K Memory Kit	849.00	705.00
26-6017 Card Cage for Model 12	199.00	169.00
26-6052 DT-100 Data Terminal	795.00	600.00
26-4155 15 Meg Hard Drive Primary	1995.00	1395.00
26-4171 35 Meg Hard Drive Primary	2995.00	2095.00
26-4157 Installation Kit for Primary HD	349.00	265.00

RADIO SHACK PRINTERS

	LIST PRICE	OUR PRICE
26-1276 DMP-105 Dot Matrix Printer	\$ 199.00	\$ 169.00
26-1275 TRP-100 Portable Thermal Printer	299.00	230.00
26-1271 DMP-110 50/25 cps Printer	399.00	299.00
26-1268 CGP-220 Color Ink-Jet Printer	699.00	345.00
26-1278 DWP-220 Daisy Wheel	599.00	460.00
26-1277 DMP-430 24 Wire Matrix Printer	899.00	745.00
26-1270 DWP-510 43 cps Daisy Wheel	1495.00	1100.00
26-1274 DMP-2100P 24 Dot Wire Matrix	1995.00	1270.00
26-1272 LMP-2150 Line Printer	3995.00	1575.00
26-1269 PT-64 Printer Controller	249.95	210.00
26-1498 SW-302 Printer Switch	119.95	100.00
26-1401 Printer Label	39.95	34.00

TANDY 1200

25-3000 Tandy 1200 One Disk & 10 Meg HD	\$2495.00	\$1525.00
25-3010 VM-3 Green Monitor	219.00	185.00
26-3212 CM-2 Color Monitor	549.95	390.00
25-3040 Monochrome Display Adapter	219.00	185.00
25-3043 Graphics Display Adapter	299.00	255.00
25-3044 Graphics Master	695.00	590.00
25-3061 Captain Multifunction Board	795.00	675.00
25-3130 MSDOS/BASIC	89.95	76.50
25-3170 Wordstar Professional	395.00	335.00
25-3160 Framework	695.00	590.00
25-3161 PFS File	140.00	119.00
25-3190 dBase III	695.00	590.00

TANDY 1000

25-1000 Model 1000 128K 1 Disk Drive	\$1199.00	\$ 845.00
25-1003 Modem Option 1000/1200	179.95	128.00
25-1004 Memory Exp 128K 1000/1200	299.95	205.00
25-1005 Disk Drive Expansion 1000	299.95	170.00
25-1006 RS-232C Interface 1000/1200	99.95	85.00
25-1007 Hard Disk Control Board	329.95	255.00
25-1009 2nd Memory Board	249.95	185.00
25-1501 MS-DOS Reference T-1000	34.95	29.00
25-1502 BASIC Reference T-1000	34.95	29.00
25-1155 Script 1000	299.95	255.00
26-3211 VM2 Green Monitor	149.95	125.00
26-3212 CM2 Color Monitor	459.95	390.00

EPSON/COMREX PRINTERS

20001015 Homewriter 10	\$ 288.00	\$ 230.00
20001025 LX-80 Dot Matrix Printer	369.00	250.00
20001030 FX-80 Dot Matrix Printer	499.00	385.00
20001040 JX-80 Color Dot Matrix Printer	699.00	485.00
20001050 HI-80 4 Pin Plotter	599.00	390.00
20002010 RX-100 Dot Matrix Printer	499.00	400.00
20002020 FX-100 Dot Matrix Printer	689.00	505.00
20003010 LO-1500 18 Pin Head with Intf	1350.00	1095.00
20003510 CR-11E Comrex Com Riter	499.00	400.00
20001510 FX-80 Tractor Feed	39.95	34.00
20004080 NLO Parallel Intr	209.95	175.00
20001515 LX-80 Tractor Feed	49.00	40.00

For Technical Questions and Information on our complete line of computer accessories and current prices.

CALL 1-517-626-4161
FOR ORDERS ONLY CALL 1-800-248-3823

124 S. MAIN ST. PERRY, MICH. 48872

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted (\$10.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., Visa, AX, add 2%. All non-defective items returned will be subject to 10% restocking fee. Defective items require return merchandise authorization. Call for R.M.A. Number before returning. Delivery is subject to product availability.

Hardware Prices: Decline and Fall

Tandyland

In the fiercely competitive microcomputer market, there's no such thing as resting on your laurels. Just six months after introducing its popular Model 1000, Tandy knocked \$200 off the price and introduced a 10-megabyte hard disk version, called the Tandy 1000 HD (see the Photo).

IBM broke the \$1,000 price barrier for an MS-DOS computer late last year, when it discounted the ailing PCjr to \$995. Tandy's willingness to follow suit with the hot-selling 1000 shows its determination to maintain a price advantage over competitors.

The new 1000 HD costs \$1,999, which happens to be the price of Tandy's hard drive PC XT clone, the 1200. Since this puts Tandy in the position of price competition with itself, I asked Dave Frager, buyer for Tandy's MS-DOS line, if the 1200 had a future. It does, he said, because the 1200 is aimed at "those people who want an IBM clone. The Tandy 1000 HD is an extension of the original machine, which is marketed as the machine the PC should have been and the PCjr never was." Frager and others at Tandy said they've made no decision to replace the 1200.

And what about the 80186-based Tandy 2000? It costs \$1,999 too. Tandy had high hopes for its high-performance micro when it hit the market in November 1983, but sales have been disappointing. The 2000 was partly responsible for Tandy's taking an \$18.3 million write-down at the end of 1985's third quarter (see the August Pulse Train, p. 21). All this makes you wonder how the 2000 fits into Tandy's plans. According to Bernie Appel, Radio Shack Division president, "the 2000 is still a viable product and will continue in the line."



Photo. The Tandy 1000 HD.

However, Appel has publicly conceded that "the 1000 and 1200 make the 2000 not as good a value as it was."

As for Tandy's marketing strategy for the fall and into the Christmas season, the word from Tandy is "push the Tandy 1000." Consider the following list of new products and peripherals available or forthcoming for the 1000:

- Tandy 1000 external 10-megabyte hard hotdisk drive
- External HD controller board
- 1,200-baud PC modem board
- Memory Plus expansion board
- Printer emulator for IBM printers (700-2118)
- The FUNDamentals, a Tandy 1000 tutorial program
- Infocom's Cornerstone data base manager

Tandy's clearly giving the 1000 all the support it can muster, almost daring competitors to take them on.

All the hoopla surrounding the 1000's success drowned out the rather quiet announcement that Radio Shack would sell off its stock of single-drive Model 4's at \$649.50. When the last one goes, Tandy won't produce any more.

This news, coming so soon after the Model 4P bowed out (see Pulse Train, August 1985, p. 21) fueled rumors that the Model 4 itself would be the next to go. As this column went to press late in June, CompuServe special-interest groups were abuzz with Model 4 talk. Some callers even quoted a Model 4 close-out price of \$795 and predicted that Tandy would introduce a new machine, possibly a replacement for the 4, in August.

"Not so," said Tandy's director of market planning, Ed Juge. "We've said repeatedly that there are long-term plans for our 8-bit machines. Plans that translate into years.

You may not see the enhancements like a hard drive or double-sided disk drives by August, but the Model 4 is not going to be replaced."

For computer buyers, meanwhile, the single-drive Model 4 sell-off is a good deal. You can get the computer for \$650, buy another disk drive from a third-party vendor for \$150, and have yourself a dual-drive Model 4 for \$800. At the time Tandy announced the sale, the dual-drive Model 4 was still selling for \$1,299 at most Radio Shack Computer Centers.

Back in February, you might have noticed a Tandy advertisement in your local newspaper imploring computer owners to "Clean up, America! Throw your orphan computer or TV game on the junk pile. . . ." The ad showed a pile of trashed computers surrounded by a

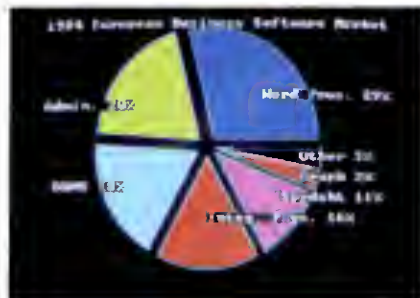


Figure. European software market share by application.

Vendor	Market Share	Units
Commodore	23.9%	2,915,800
Texas Inst.	17.1%	2,086,200
Apple	11.7%	1,427,400
Atari	11.5%	1,403,000
Tandy	11.0%	1,342,000
IBM	6.2%	756,400
Others	18.6%	2,269,200
Totals	100.0%	12,200,000

Table. Top U.S. home computer brands.

list of companies who had, in Tandy's eyes, orphaned their products, leaving consumers without support. Tandy offered \$75 or \$150 for the so-called orphans when owners traded them in for a Tandy computer.

Not everyone found the ad amusing. Victor Technologies, whose Victor 9000 was one of the products listed, has filed suit against Tandy in San Francisco's U.S. District Court. Victor wants Tandy to retract the "orphan" tag in the 1,000 newspapers in which the ad appeared, and to pay \$1 million in punitive damages.

Victor says it never stopped manufacturing, selling, or servicing the 9000, although the company has been through Chapter 11 bankruptcy proceedings. The suit charges Tandy with trademark infringement, unfair competition, defamation, and interference with business relations.

Tandy did send Victor a letter of apology, but so far has declined to publish a retraction.

Is Tandy abandoning Xenix? That was a concern at this year's Tandy Computer Business Users' Group meeting (TCBUG). Many TCBUG members are large corporate micro users who've invested substantially in Tandy's multiuser system. They wanted to know if Tandy would continue to support Xenix or jump ship to AT&T's Unix multiuser operating system.

Tandy's CEO, John Roach, told the group, "You've got AT&T on one side, and they've said they're Unix 5-oriented. IBM is on the other side, saying they're Xenix-oriented. Now, someone is going to be excluded in this battle. ... I'm not going to say which one I think will end up being excluded, but I don't want to be lined up with the excluded."

Roach's answer indicates that Tandy plans to sit back and wait before committing to one system or the other. But if Tandy, the leading seller of multiuser systems, straddles the fence, it might be a while before the Unix/Xenix issue resolves itself. Maybe AT&T and IBM should be watching Tandy, not vice versa.

A new mass-storage system is showing up at Radio Shack Computer Centers. It's called the Tandy Cartridge Disk System and Tandy's marketing it by agreement with Iomega Corp. It uses Bernoulli Box technology, a variation on hard disk drives. You get 10 megabytes of storage in the form of a flexible, removable cartridge.

A complete system costs \$2,195. The replaceable 8 $\frac{1}{2}$ -by 11-inch cartridges are \$89.95.

MicroTrends

The European microcomputer market doesn't get press in the U.S., but that doesn't mean nothing's happening "over there."

A study by the Paris-based consulting firm Intelligent Electronic Europe forecasts 30 percent growth in Europe's personal computer software market in 1985. Software sales totaled \$550 million in 1984 and could reach \$710 million this year.

But the report found that European software developers face handicaps that will tend to limit many products' growth. Their technology often lags several months behind the U.S.'s, which means a new European product may have to compete with an already established American product. When European distributors look for new products, they look to the West; it's rare for a program from one European country to be successfully marketed in another. Distribution channels are fragmented, and language barriers are a problem.

The report concludes that overall prospects for an independent European software market aren't good. Chances for success seem to be limited to two areas: managerial/administrative programs, and specialized, vertical applications aimed at smaller markets (see the Figure).

Commodore is sailing away with the biggest share of the home computer market, according to a recent study by Future Computing.

Researchers surveyed nearly 17,000 computer owners in 24 urban areas. They found, not surprisingly, that the New York metro area leads the nation in home computers, with 900,000 units. Of those computers, 30 percent are Commodores. Los Angeles has the second-largest home computer population, of which 24 percent are Commodores.

Nationwide, Commodore has a 23.9 percent market share (see the Table). Other top brands included Texas Instruments, Apple, Atari, and Tandy/Radio Shack, which took fifth place with an 11 percent market share.

Since 1979, Software Arts has sold more than 800,000 copies of VisiCalc. But when Lotus Development Corp. bought out Software Arts, it decided to discontinue the venerable spreadsheet.

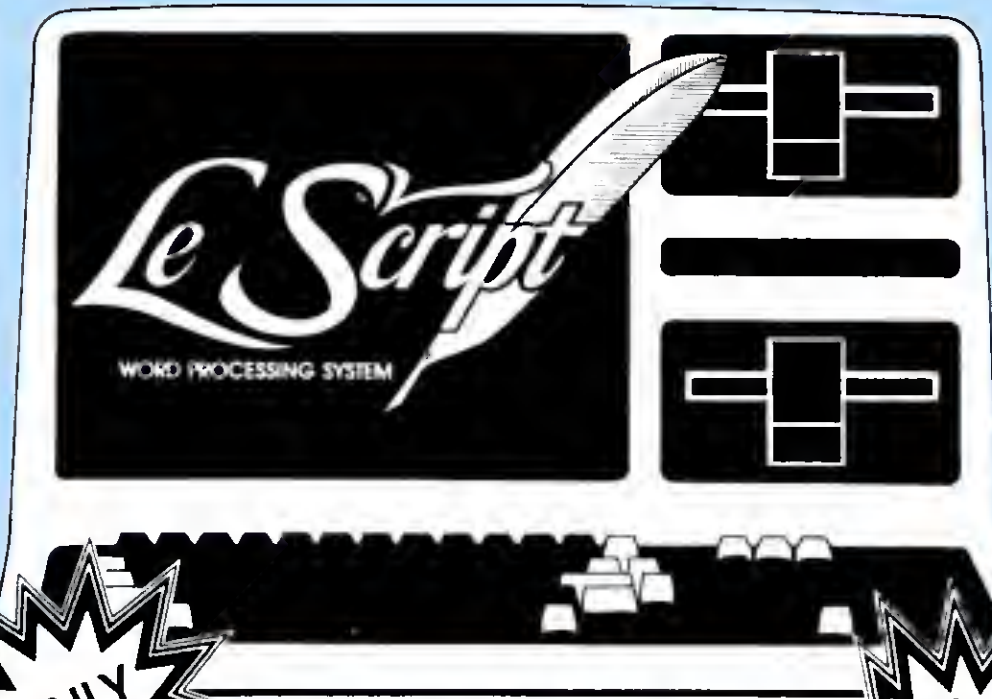
At Lotus' annual meeting in May, chairman Mitch Kapor called the product "mature" and said that Lotus plans for VisiCalc "would reflect that status." In announcing VisiCalc's demise, Lotus said they'd support the program for the next two years.

Two other products that Lotus acquired from Software Arts are also in a state of transition. In July, Lotus began marketing the desktop management program Spotlight under its own logo. However, Lotus won't be selling TK!Solver, an equation processor originally designed for engineers. Instead, Lotus is looking for a third-party manufacturer to produce and market the program.

New Threads

Tandy computer owners have a new on-line source of information. ... and a new place to air their pet peeves. Delphi, the Cambridge, MA, communications and information utility, has added a Tandy User's Group to its system. The special Tandy section contains public-domain programs, utilities, reviews, a message forum, and a "Tandy Topics" conference facility. The access number is 617-576-0862. ■

TRS-80 AND IBM-PC Word Processing Program



Computers Supported
IBM-PC
IBM-XT
Tandy 1000
Tandy 1200
Tandy 2000
Model 4
Model 2
Model 12
Model 16
Model 4 CP/M
Model 2 CP/M
Max-80
LNW

ONLY
\$129.95

"For \$129.95 you'll be
hard-pressed to find a better
overall word processing product."

(LSI JOURNAL, January, 1984)

CP/M
& IBM
Versions
\$199.95

- ☐ 80 x 24 DISPLAY using TRSDOS 6 or any MODEL III DDS.
- ☐ Built-in FORM LETTER and MAIL-MERGE capabilities.
- ☐ Built-in HELP SCREENS.
- ☐ 55 separately programmable MACRO FUNCTION KEYS.
- ☐ Performs PROPORTIONAL SPACE right-margin justification on over 120 different printers (all drivers included FREE).
- ☐ Integrates with ELECTRIC WEBSTER spelling checker.
- ☐ Keyboard entry and printing of 31 European Characters and special symbols.
- ☐ IBM-PC, XT, Tandy-1000, Tandy-1200, Tandy-2000 versions for color or Monochrome, now only \$199.95.
- ☐ MODEL 2/12/16 versions now available for TRSDOS 2.0, TRSDOS 4.2 and CP/M. \$199.95.
- ☐ LeScript also available to run on TRS-80 MODEL I, MODEL III, LNW-80, LNW-TEAM (80 x 24), Holmes VID-80 (80 x 24), and Lobo MAX-80 (80 x 24). \$129.95

CALL 1-305-259-9397



FREE SHIPPING WITHIN THE U.S.; OUTSIDE THE U.S. ADD \$10.00 FOR SHIPPING.
FLORIDA RESIDENTS ADD 5% SALES TAX. ALL ORDERS PREPAID BY CHECK,
MONEY ORDER, CREDIT CARD OR C.O.D. Circle 141 on Reader Service card.

FREE

TRIAL-SIZE DISK OFFER

Fill out and return this coupon to receive a free trial-size copy of the LeScript word processing system - a \$25.00 value.

Name _____

Address _____

City _____

State _____

Zip _____

Telephone _____

My system is

- | | | |
|--------------------------------------|--|--|
| <input type="checkbox"/> Model I/III | <input type="checkbox"/> Holmes VID-80 | <input type="checkbox"/> CP/M LNW-TEAM |
| <input type="checkbox"/> Model 4 | <input type="checkbox"/> Model 12 | <input type="checkbox"/> CP/M VID-80 |
| <input type="checkbox"/> MAX-80 | <input type="checkbox"/> CP/M Model 4 | <input type="checkbox"/> TANDY-2000 |
| <input type="checkbox"/> LNW-TEAM | <input type="checkbox"/> CP/M MAX-80 | <input type="checkbox"/> IBM PC |

Send to ANITEK • P.O. Box 361136 • Melbourne, FL 32936

The PRODUCER
Winner of
★★★★★
FIVE STARS
in 80 MICRO Magazine's
Software Review

January 1985
The PRODUCER gained
this perfect rating
based on
Ease of Use
Quality Documentation
Freedom from Bugs
Ability to Do the Job

You can quickly create programs
to manage such things as
mail lists, personnel records,
inventory control, catalogs,
loan calculations, schedules,
personal finances.
The only limit
is your imagination!

**THE PRODUCER
CAN SAVE YOU MONEY!** Why buy
expensive data base programs that never
quite do what you want. The PRODUCER
can write all your data storage and
retrieval programs for you -- quickly,
easily, and to your exact specifications.
Investing in The PRODUCER is money
saved over and over again.

**THE PRODUCER
CAN SAVE YOU FRUSTRATION!** No
more frustrating dependence on
inadequate software that someone else
packaged for mass consumer use. With
The PRODUCER you can design and
write custom software to meet your exact
needs. You can become a programmer
even though you have no previous
programming experience. The
PRODUCER helps you plan what you
want and then writes all the code for you at
the push of a button.

**THE PRODUCER
CAN SAVE YOU TIME!** What formerly
was impossible for novices, can now be
done with ease. What formerly took
professional programmers days and
weeks, can now be accomplished in
minutes. After a few hours going through
The PRODUCER's easy to follow Tutorial,
you will have an incredible time saving
tool at your fingertips. Most PRODUCER
users testify that they can create complete
programs from start to finish in as little as
fifteen minutes. You will soon be
wondering how you could ever have done
without The PRODUCER.



The PRODUCER Professional Program Writer

Beginners can program with no experience necessary.
Professional programmers can save days and weeks of time.

WITH THE PRODUCER YOU CAN ENJOY THESE OUTSTANDING FEATURES

- An easy-to follow tutorial that takes you step by step through The PRODUCER process. It's all you need to get started and even lets you create an actual program as you learn.
- The best screen generator available anywhere. You have full screen control including graphics. You can add, insert, delete and move blocks of text on screen or between screens.
- Full support for all math functions, including subtotals and global calculations.
- A B-Tree file structure, that gives extremely fast access to data, allows global search and replace, data entry by batch mode and automatic file rebuilding.
- The Freeform Report Generator provides amazing versatility to design text placement, interfield calculations and formats. You can even print reports on your standard forms.
- Full editing control at all times. You can easily edit and refine at any point, including the finished program, without having to start over. That's a feature not found on other products. The screen generator lets you experiment, rearrange, "cut and paste" between trial screens and change your mind any time you wish.
- A fully indexed reference manual of over 200 pages gives you complete technical support at your fingertips. You may never need to read it, but it is all there just in case.
- Outstanding technical support. Your PRODUCER package comes with four free issues of The PRODUCER quarterly newsletter. And should you ever need direct technical assistance, you may call a Producer Software technician for free counsel and trouble shooting.
- No payment of royalties. That's right. Provided you give proper credit, you may sell PRODUCER generated programs without paying royalties. Finished programs do not need the original PRODUCER system disk to run, so they are easy to duplicate and distribute. The PRODUCER can put you into the programming business for friends and associates.

★★★★★

"The longer I used The Producer, the more impressed I was. After only one month, it had found a place among my most often used software."

Hardin Brothers
Reviewer, 80 Micro

"The Producer is an excellent package, capable of doing everything I wanted it to."

Hardin Brothers
Reviewer, 80 Micro

"The Producer will allow you to develop a data base program in a couple of hours that would take months to program and debug by hand."

Charles Knight
Reviewer, Basic Computing

"The Producer is certainly one of the better buys in today's software marketplace."

Charles Knight
Reviewer, Basic Computing



TRS-80 Models
I, III, IV, 4-P

Requires 48K, 2 Disk Drives

\$199.95

1-800-433-5355

(TX) 214-456-0074

Ask about DATA SHUFFLER
All purpose Sort/Merge program.

We accept money orders, cashier's checks,
VISA, Master Card, and American Express
Circle 76 on Reader Service card.

Prompt Attention

José E. Anaya's Basic Input routine, Prompter, ("Restricted Entry," May 1985, p. 70) is neat, but it lacks one feature that I feel is important for an IN-KEYS subroutine: an input delimiter. I changed the lines shown in Program Listing 1a to print a series of graphics blocks, so you can tell exactly how many characters you can enter during a program run. These changes work on the Models 1, III, and 4. Changing lines 150 and 190 as shown in Listing 1b gives an automatic carriage return when you've typed in the number of characters that LM specifies.

Rod Mallory
Rt. #12, Box 71-D
Goldsboro, NC 27530

Just for Openers

I begin all my programs with the lines:

```
1 GOTO 10
2 SAVE "Program Name". A:STOP
3 LPRINT LEFT$(TIMES$,8):LPRINT:LLIST:STOP
```

This gives me some flexibility in how I run my programs (the program actually begins on line 10). If I want to run the program conventionally, I type in RUN. If I want to save it to disk after a modification, or save every few lines as I type in the program, I use RUN2. RUN3 prints the date and lists the program to the printer.

Dr. Jacques Weill
43, rue Principale
37250 Veigne
France



Sensor Deprivation

An incompatibility between the Epson RX-80/FT printer and the Model 4 causes problems with the Epson's paper-out sensor. Pressing escape-8 disables two lines going to the computer, but the third line, pin 12 on the RX-80 side, pin 23 on the Model 4 side, remains active. This 1-byte patch to the printer driver corrects the problem:

```
For TRSDOS 6.1 PATCH SYS0/SYS.LSIDOS
(X'0E47' = B0)
For TRSDOS 6.2 PATCH SYS0/SYS.LSIDOS
(X'0E39' = B0)
```

The byte B0 replaces the byte F0 in the AND OFOH statement. This masks bit 6 and the paper-out feature now works correctly.

Hubert C. Borrmann
Star Route Box 3450
Lillian, AL 36549

Watching Serials

There's a dearth of information to help owners of serial printers operate in a world of programs designed chiefly with parallel printers in mind. I suspect the need in this area will grow, since several electric typewriter manufacturers produce units with an RS-232C port.

I have a Model III with tape input and Scripsit 1.3. The output feeds into a serial printer, but the arrangement has an awkward drawback. I have to initialize the RS-232C with a POKE instruction before loading Scripsit. If I forget to do this, I must save my file to tape before returning to Basic, or lose everything I've typed. The following addition to Scripsit does the initialization automatically:

```
42D9 CD 5A 00 CALL 005AH
      :CALL $RSINIT
42DC C3 03 43 JP 4303H
      :JP TO ENTRY ADDR
```

One convenient way to load Scripsit, make the change, and save the revised version to disk is via David Trapasso's Tape48 ("Tape It Easy," January 1984, p. 112). This utility lets you load any machine-language program, read out its name and three key addresses, change memory contents, write to tape at 500 or 1,500 baud, and verify the result. The original and revised addresses for Scripsit 1.3 are:

	Original	Revised
Start address:	42E9	42D9
End address:	6AA8	6AA8
Transfer address:	4303	42D9

The same pattern could apply to many other programs. Naturally, you'd make these changes to a copy of your software, not the master tape.

John H. Schoberg
1049 McMurdo Drive
Kamloops, BC
Canada V2C 3G8

The Seekers

I'm using a Model III, and would like to find a C compiler that produces source code compatible with Microsoft's Macro-80 (M80) assembler.

Dan Henderson
6770-65 Ave.
Red Deer, Alberta
Canada T4P 1A5

Program Listing 1. Modifications to Prompter.

```
(a) 150 IF LN=LM THEN GOTO 160 ELSE PRINT PT$;:GOSUB 120:
      PRINT BS$;:IF Z$<>"" THEN RETURN
      180 LN=0: BF$="":PRINT CHR$(15);:PRINT STRING$(LM,132);
      STRING$(LM,24);
      190 GOSUB 150: IF Z$=CR$ THEN PRINT CHR$(14);
      STRING$(LM-LN,30);: RETURN
      210 IF LN=0 THEN 190 ELSE LN=LN-1: BF$=LEFT$(BF$,LN):
      PRINT BS$; STRING$(2,132); STRING$(2,24);:GOTO 190

(b) 150 IF LN=LN THEN RETURN ELSE PRINT PT$;:GOSUB
      120: PRINT BS$;: IF Z$<>"" THEN RETURN
      190 GOSUB 150: IF LN=LM THEN RETURN ELSE IF
      Z$=CR$ THEN PRINT CHR$(14); STRING$(LN-LN,30);:
      RETURN
```

End

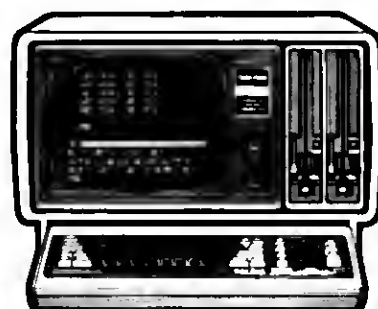
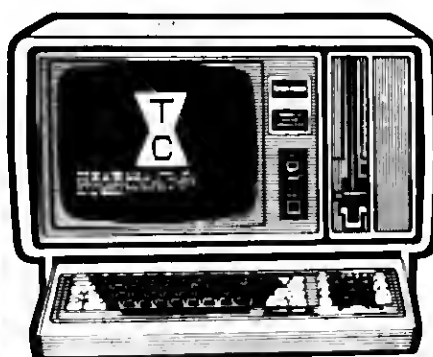
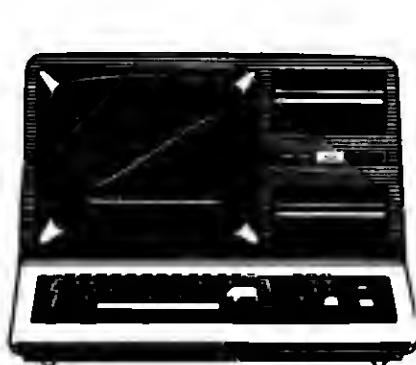
NOCONA

ELECTRONICS

MODEL 4

MODEL 6000

MODEL 12



256K MOD 2000 W/MONO MONITOR ...	1319.00	CGP 220 PRINTER	499.00
256K MOD 2000 W/COLOR MONITOR ...	1629.00	DMP 105 PRINTER	145.00
256K MOD 1200 HD 1 DR.	1499.00	DMP 120 PRINTER	249.00
128K MOD 1000 W/MONO 1 DR.	839.00	DMP 430 PRINTER	585.00
128K MOD 1000 W/COLOR 2 DR.	1199.00	DMP 2100P PRINTER	1019.00
256K MOD 1000 W/10 MEG HD	1439.00	DWP 220 PRINTER	429.00
24K MOD 100 PORT	399.00	DWP 510 PRINTER	999.00
24K MOD 200 PORT	769.00	TRACTOR DWP 220	99.00
64K MOD 4 2DR.	925.00	TRACTOR DWP 11/510	159.00
512K MOD 6000 2DR.	3099.00	TRACTOR FEED DMP2100P	99.00
80K MOD 12 2DR.	1199.00	PARALLEL PRINTER SWITCH	96.00
15 MEG HARD DISK	1329.00	PARALLEL PRINTER CONTROLLER ...	179.00
35 MEG HARD DISK	2059.00	70 MEG HARD DISK	2949.00
NEW DMP 2200 PRINTER		1149.00	

100% RS COMPONENTS NO FOREIGN DRIVES OR MEMORY FULL WARRANTY

ALL RS SOFTWARE 20% OFF CATALOG PRICE

CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS

(817) 825-4027

NOCONA ELECTRONICS • BOX 593 • NOCONA, TX 76255

READER EXCHANGE

I'm looking for a repairman who can fix a disk controller on an LNW 80-2. The drives begin to spin on reset, but then quit before the DOS has a chance to load fully. I've tried a number of DOSes and had the drives checked. If anyone knows of a good LNW repair outlet, or has had the same problem, I could use some help.

Alon Schmautz
1321 5th Ave. E.
Kalispell, MT 59902

I have a Model I with a Lobo interface. The interface has a 40-pin edge card connector for a printer. I'm not able to find a compatible printer for a reasonable price. Radlo Shack can't get me a modified cable or adapter with a 40-pin edge connector and a 36-pin plug connector. Can someone help?

Peter M. Puchowski
217 Strathearn N.
Montreal W., Quebec
Canada H4X 1Y1

Error Trap

Several lines are missing from the object code listing of Jay Walton's Tape Check program (November 1984, p. 92). You should insert the lines in Program Listing 2 after line 420.

—Eds.

My Model 4 conversion of Bruce A. and Jeffrey P. Graebner's Grapher program (April 1985, p. 40) has a problem. Grapher assumes the module PRINTR is within the main body of the program, but it isn't. This causes line number errors. The following addition to Program Listing 1 should clear up the trouble:

145 CHAIN MERGE "PRINTR",150,ALL

Line 145 loads in the module before the main program executes.

David Engelhardt
10221 W. 101st. Place
Broomfield, CO 80020

Line 1972 of Howard Potvin's modifications to NovaCalc (Reader Exchange, July 1985, p. 25) contained a typographical error. The less-than character (<) should be a left parenthesis. ()

—Eds.

Program Listing 2. Lines missing from Tape Check object code listing.

```
00430 VERCHK  DEFL  $
00440 ERRMSG  DEFW  0D0DH
00450         DEFM  '*** ERROR - TAPE BAD - TRY AGAIN ***'
00460         DEFW  0D0DH
00470 READY   DEFM  '**** READY CASSETTE ****'
00480         DEFW  0H
00490 TAPEOK  DEFW  0D0DH
00500         DEFM  '*** TAPE OKAY ***'
00510         DEFW  0H
00520 VERIFY  DEFW  0DH
00530         DEFM  '*** VERIFYING SOURCE TAPE - PLEASE
WAIT ***'
00540         DEFW  0D0DH
00550 TPEHME   DEFM  'SOURCE TAPE HAME IS '
00560         DEFW  0H
00570 *LIST ON
```

End

Circle 374 on Reader Service card

PRINTER DRIVERS FOR SUPERSCRIPIT

Easily and automatically attach your printer to SuperSCRIPT with an ALPS software printer driver program. No need to learn special printer codes. Call or write for info describing features supported on each printer (underline, bold, proportional, scripts, etc.).

Over 120 Different Printers Supported.
Custom Printer Driver For Each Printer
2-1/2 years experience. Customer Support !!!
\$49 or \$59 each, depending on printer.

MSDOS UTILITIES TANDY 1000, 1200, 2000 IBM PC/XT/AT

No Technical Knowledge Required !!! Easy To Use

**** RANDISK **** \$49
RANDISK -- Use spare memory as a superfast disk to speed up applications. (You specify Ramdisk size). Appears to programs as a disk, but never install. Access. Easy to install and use.

**** ALPHA TOOL BOX **** \$59
ALPHABETIZED DIRECTORY DISPLAY -- View Directory on 1 screen (3 columns, sorted, Fast!)
FIND FILE -- Search all directories for file
DIRECTORY DIREX -- Display all sub-directory names in an easily readable form
BACKMOD MODIFIED FILES -- Quick, automatic backup of files. Backup in same format as original. Perfect for Hard Disks. Also for floppies.

**** BETA TOOL BOX **** \$59
SINGLE KEY COMMAND -- Define any text string (or DOS Command) as a single keystroke. Press single key to execute commands!
COUNT LINES -- Superfast count of lines in a file
DUMP FILE IN HEX -- Formatted dump of file in Hex/ASCII. Scroll Forward, Backward, Begin, End
CHANGE FILE ATTRIBUTES -- Make files hidden, readonly, archive, etc. Set or reset attributes.

**** SERIAL PRINTERS **** \$49
Connect your Serial Printer to your RS232 port. Full handshaking. Easy commands. Complete instructions.

Don't miss the review of these ALPS utilities in the February, 1985 issue of 80 Micro (P.119). More ALPS Tools Available. Call or Write for ALPS catalog. Customer Support !!!

ALPS
23 Angus Road
Warren, New Jersey 07060
201-647-7230



Put an Amber CRT in Your Computer

Now you can eliminate the strobe, flicker and fatigue from your computer terminal with a new amber Soft-View™ replacement CRT from Langley-St. Clair.

Available for the TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC, Apple III and a wide variety of other monitors. These new replacement display tubes use amber phosphors which exceed the European standards for persistence and color. And the "decay" or fade-out rate of the phosphor is the same as the "refresh" or scanning rate of the computer screen, so the display glows gently, rather than flickering like a strobe light — an annoying problem with inexpensive green phosphor tubes.

- Available in medium decay "European Phosphor" (the standard in Europe).
- Made with Lead/Strontium Impregnated glass that stops X-ray emission.
- High-contrast double dark face glass that also cuts U.V. radiation.
- Face of tube is etched to stop glare.
- Easily Installed...comes with pre-mounted hardware.
- Ideal for word processing and programming, yet fast enough for games and graphics.
- Warranted for one full year against manufacturing defects or tube failure.
- Comes with a 30 day money back guarantee.



Call now to order your Soft-View™ CRT from Langley-St. Clair — \$99.95*

800 221-7070

In New York call 212 989-6876

Please specify computer and model number when ordering. Dealer inquiries invited.

TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC and Apple III are registered trademarks of Tandy Corp., TeleVideo Corp., Hardware Systems, Inc., Heath Co., Digital Equipment Corp., IBM and Apple Computer, Inc. Soft-View is a trademark of Langley-St. Clair Instrumentation Systems, Inc.

Langley-St. Clair
Instrumentation Systems, Inc.
132 W. 20th St. New York, NY 10011

ANYONE CAN USE OUR SOFTWARE!



MAIL PAC II FEATURES:

High Capacity --

Stores from one to one million names in Zip Code, Numerical or Alphabetical order. The only limitation is your disk storage space.

Flexibility --

Prints your mailing list on 1, 2, 3, or 4-across labels (with up to 5 user-defined lines on each label) or as a compact, user-designed directory. The record length is completely user-defined, and each field within each of your records is completely variable (allowing storage of any number of characters for any particular address entry). Devote fields to telephone numbers, codes, or even special messages related to each particular name on file.

Powerful --

A built-in word processor allows you to create personalized form letters for each address on your list (or just a particular group of addresses).

Ease of Use --

Create new mailing lists, review existing lists, handle changes of address, delete cancelled names, sort lists, and purge duplicate names from your files. Complete on-screen instructions tell you in plain English exactly how to accomplish all of these tasks.

MAIL PAC II **\$99.95**

MAIL PAC II and CHECKING PLUS represent a new generation of computer software. Our software doesn't even need a manual! Anyone can quickly learn to use either package by following simple, explicit on-screen instructions. But, for those of you who insist -- we've included a complete user's manual as well.



CHECKING PLUS FEATURES:

Complete Check Register --

Checking Plus stores your entire check register in a disk file, and then uses the data to balance your account, track your expenses, and help you make budget projections. Review the entire checkbook, enter checks, deposits, fees and adjustments, mark outstanding checks when paid, and get an instant cash balance at any time. All data can be viewed onscreen or printed out in report form.

Tax Preparation --

Storage of monthly and yearly totals and other important information aids in income tax preparation, for your personal use or for your accountant.

Handles the Details --

Store names and addresses for frequently written checks, then print checks to fit standard window envelopes, eliminating the need for extra typing. You can even store any comment, explanation or other message (up to 255 characters) related to a particular check.

Automatic Monthly Bill Payments --

Enter amounts and names of payees for all of your fixed-cost monthly payments, and then sit back while the system automatically prints checks.

CHECKING PLUS **\$99.95**

Both Programs Require 48K And At Least One Disk Drive (2 Drives For Higher Storage Capacities). And All Hard Disk Systems Are Supported.

FREE—TRS-80 Mod I, III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

FOR YOUR TRS-80™ • APPLE™ • IBM PC™ • NEC™ • OSBORNE™ • XEROX™ • KAYPRO™ • TELEVIDEO™ • ZENITH™ • SANYO™
DEC™ • TI PROFESSIONAL COMPUTER™ • SUPERBRAIN JR.™ • EPSON™ • Any CP/M™ Computer

CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

TRS-80 trademark Tandy Corp. • APPLE trademark Apple Corp. • IBM PC trademark IBM Corp. • ATARI trademark Atari, Inc. • OSBORNE trademark Osborne Corp. • XEROX trademark Xerox Corp.
KAYPRO trademark Non-Linear Systems, Inc. • TELEVIDEO trademark TeleVideo Systems, Inc. • SANYO trademark Sanyo Corp. • NEC trademark NEC Corp. • DEC trademark Digital Equipment Corp.
ZENITH trademark Zenith Corp. • TI PROFESSIONAL COMPUTER trademark Texas Instruments Inc. • SUPERBRAIN trademark Intertec Corp. • CP/M trademark Digital Research Inc. • EPSON trademark Epson Corp.

OUR SOFTWARE CATALOG

H & E Computronics, Inc., has mailed more than 1 million software catalogs since 1978. Send \$2 for our new 64-page catalog today! (We also send you our catalog FREE with every order) DEALER INQUIRIES WELCOME

30-DAY MONEY BACK GUARANTEE

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***
DELIVERY SUBJECT TO AVAILABILITY

COMPUTRONICS
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977

24 HOUR ORDER LINE
(914) 425-1535

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
ADD \$5.00 TO CANADA & MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S.
CANADA & MEXICO



NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

Supercross/XT Bridges the Gap of Incompatibility

by John B. Harrell III

★★★★★

Supercross/XT runs on the Models I (double-density drives required), III, and 4/4P. Powersoft Products, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248. 214-733-4475. Supercross/XT \$99.95. Hypercross available from Hypersoft, P.O. Box 51155, Raleigh, NC 27609, 919-847-4779. \$49.95 to \$129.95.

Easy to use: ★★★★★
Good docs: ★★★★★
Bug free: ★★★★★
Does the job: ★★★★★

Supercross/XT is a versatile disk-based utility that lets you easily transfer files between a TRS-80 computer and a CP/M or MS-DOS machine. It also supports full file transfer between CP/M and MS-DOS computers with no intermediate steps. I can use the files I transfer between systems with virtually no change. I also use Supercross to format disks for my Tandy 2000 to transport information to my IBM PC/XT. This is the most useful program I've seen in quite some time.

Supercross was originally developed by Hypersoft (as Hypercross) and they license it to Powersoft. Hypersoft markets four different versions of the utility: 40 CP/M formats, four MS-DOS formats (1.1/2.X), 70 CP/M and MS-DOS formats, and 130 CP/M and MS-DOS formats. Since Supercross and Hypercross are essentially the same, all comments made about Supercross apply to Hypercross.

Getting Started

Supercross comes on a standard disk compatible with the format you order. The Model 4/4P version contains the

complete disk operating system and the software (including back-up copies in case of disaster).

The Model III version comes without an operating system but works with any of the popular Model III operating systems; however, I tested it only under LDOS 5.1.4. The Model I version comes on single-density disks and requires the double-density modification to work properly.

When you first run Supercross, you answer several questions describing your computer system and the configurations available for the alien disk formats (see Fig. 1). A utility on the disk builds a configuration file that bypasses these prompts on subsequent runs. You can set up to 10 user-defined configuration files.

Supercross Commands

Once you have Supercross running, a simple menu displays the disk formats you selected and summarizes the commands (see Fig. 2). In addition to the complete command set, Supercross provides quick commands, an easy-to-re-



member subset of the most frequently used commands that you can abbreviate to one or two letters.

You can display a disk directory of the selected drive. The command syntax is identical to TRSDOS's and you can specify either a directory of the default alien drive or the default TRS-80 drive.

Supercross distinguishes between the native TRS-80 drive formats and the alien formats by the drive designator. Drive numbers 0-7 indicate standard TRS-80 disks and drives A-D designate disks in either CP/M or MS-DOS format.

Under TRSDOS 6.X (and LDOS), you can reassign logical disk drive numbers to any physical drive device. But Supercross doesn't allow drive remapping with alien formats; drive A represents physical disk drive unit zero.

The versatile Copy command supports transfer of a file to and from the TRS-80 format to any other format. The XFER command transfers data between CP/M and/or MS-DOS formats. You can enter the command in full or use the quick format.

Unfortunately, Supercross doesn't support wildcard file names. Copy and XFER support three types of file transfers: image, ASCII, and random.

The image mode copies an exact image to the target disk. This is the usual method of transferring binary files such as data bases and spreadsheet files.

The ASCII file transfer mode compensates for the differences in storing ASCII files on TRS-80 and MS-DOS or CP/M computers, including carriage-return/line-feed variations, end-of-file marks, and certain nonstandard TRS-80 characters.

The random mode transfers a TRS-80 file stored with the logical record length set to fewer than 256 bytes. Supercross otherwise transfers the file in the image mode.

To remove files from the target disk, use the command with which you're most familiar. Supercross offers four alternative commands corresponding to the respective disk operating systems.

The Format command lets you format a disk in any of the available formats. You identify the target disk drive as you do for the Directory command. However, the Format command doesn't duplicate the code found in the boot sectors of the source disks. While the documentation states that some programs may reject these disks if they check the boot sector, I haven't experienced this in many transfers to MS-DOS systems.

You can change your transfer configuration by pressing the C key from the main menu; this takes you to the Configuration menu (see Fig. 3). You can select a new format from either of the two alien formats, change the default drives, the formats, or the actual disk drive configuration. The user command also provides a convenient way to access different user areas on CP/M disks.

Supercross has a powerful facility for moving files in bulk. The Tag command displays the directory of the source disk one item at a time and lets you select the option for transferring the file or for file removal.

The Star Ratings

80 Micro's star ratings reflect our reviewer's impression of a product.

In most cases, the overall rating is an average of the ratings in each of the four specific categories. However, some overall ratings may be higher or lower than this average, depending on the reviewer's subjective opinion.

The stars mean:

- ★★★★★ Superior;
- ★★★★ Excellent;
- ★★★ Good;
- ★★ Fair;
- ★ Poor.

The ratings terms translate as follows:

Easy to use: How easy is it for the new user to use the hardware/software/book?

Good docs: Is the documentation clear and helpful in explaining the product's use and anticipating user problems?

Bug free: Did the reviewer encounter any bugs while using the product?

Does the job: How well does the product do what it was designed for?

SuperCROSS DOS Format Selection Menu. Enter 2 character Code.

*** SuperCross				Serial No: P41022XT ***			
Type	Tks/Sds/Den			Type	Tks/Sds/Den		
1A PC/MS-DOS 1.1	40	SS	DD	1B PC/MS-DOS 2.0	40	SS	DD
1C PC/MS-DOS 1.1	40	DS	DD	1D PC/MS-DOS 2.0	40	DS	DD
1E PC Tandy 2000	00	DS	DD	1F Aardvark	35	SS	DD
1G Access Matrix	40	SS	DD	1H Access II	40	DS	DD
1I Altos	00	DS	DD	1J Ampro Ltl Bd.	40	SS	DD
1K ATR 0000	40	SS	DD	1L CCS	35	SS	DD
1M Cromemco Z-2	40	SS	SD	1N Cromemco Z-2	40	SS	DD
1O Cromemco	40	DS	DD	1P DEC VT100 Robin	40	SS	DD
1Q DEC Rainbow	00	SS	DD	1R Eagle	00	SS	DD
1S Epson	40	DS	DD	1T Epson QX10	40	DS	DD
1U Florida Grphica	00	DS	DD	1V HP 125	40	DS	DD
2A IBM PC CP/M-06	40	SS	DD	2B Kaypro II	40	SS	DD
2C Kaypro 4 & 10	40	DS	DD	2D LNW-00/Team	40	SS	DD
2E Lobo Max-00	40	SS	DD	2F Max-00 CPM 3.0	40	SS	DD
2G Morrow MicroDec	40	SS	DD	2H Morrow	40	DS	DD
2I NEC PC-0001	40	SS	DD	2J Osborne-I	40	SS	SD
2K Osborne-I, Exec	40	SS	DD	2L Otrona	40	DS	DD
2M Sanyo 1000	40	DS	DD	2N Sanyo 1250	00	DS	DD
2O Sanyo 2000	00	SS	DD	2P SD Computers	40	SS	SD
2Q Superbrain	35	SS	DD	2R Superbrain D	35	DS	DD
2S Teletex	35	SS	SD	2T Teletex	35	SS	DD
2U Teletex	35	DS	DD	2V Televideo 002	40	SS	DD
3A Televideo 802	40	DS	DD	3B Televideo 1603	00	DS	DD
3C TRS00 1 CPM 1.4	35	SS	SD	3D TRS00 1 FEC	40	SS	SD
3E TRS00 1 FEC	40	SS	DD	3F TRS00 1 Omikron	40	SS	SD
3G TRS00 1 Omikron	40	SS	DD	3H TRS00 3 Holmes	40	SS	DD
3I TRS00 3 Hurrican	40	SS	DD	3J TRS00 3 MM Shfl	40	SS	DD
3K TRS00 3 Omikron	40	SS	DD	3L TRS Mtzuma 1.30	40	SS	DD
3M TRS Mtzuma 1.30	40	DS	DD	3N TRS Mtzuma 1.4x	40	SS	DD
3O TRS Mtzuma 1.4x	40	DS	DD	3P TRS Mtzuma 2.2x	40	SS	DD
3Q TRS Mtzuma 2.2x	40	DS	DD	3R TRS00 4 CPM 3.0	40	SS	DD
3S Xerox 020-II	40	SS	SD	3T Xerox 020-II	40	DS	SD
3U Xerox 020-II	40	SS	DD	3V Xerox 020-II	40	DS	DD
4A Zenith-Rth H09	40	SS	SD	4B Zenith-Rth H09	40	SS	DD
4C Zenith-Rth H09	40	DS	DD	4D Zenith-Rth H09	00	DS	DD
4E Zenith-Rth Z90	40	SS	DD	4F Zenith Z100	40	SS	DD
4G Zenith Z100	40	DS	DD	4H Zenith Z100 Bre	40	DS	DD
4I Zorba	40	DS	DD	4J Zorba Z2000	40	DS	DD
4K Zorba Q	00	DS	DD	4L Zorba Z2000Q	00	DS	DD
4M 0 inch CPM std.	77	SS	SD				

Figure 1. SuperCROSS/XT formats.

* SuperCROSS/XT * TRS-00 <-> MS-DOS & CP/M File Transfer
Copyright 1985 HyperSOFT, Published by PowerSOFT Products
Serial No. P41022XT

Drive - B C D is format F1 PC/MS-DOS 1.1 40 SS DD
Drive A - - - is format F2

Enter Command or select from Quick Menu:

DA	Directory of Alien disk	TA	Tag Alien default disk
DT	Directory of TRS-00 disk	TT	Tag TRS-00 default disk
T	Copy TO alien from TRS-00	F	Copy FROM alien to TRS-00
FA	Format default Alien drive	C	Set Configuration
H	Help	X	Exit to DOS

Figure 2. Main menu of SuperCROSS/XT.

Drive - B C D is format F1 PC/MS-DOS 1.1 40 SS DD
Drive A - - - is format F2

Drive	Tracks	Format	Skip	Default
A	0	40	2	N TRS-00
B	1	40	1	N Alien
C	2	40	1	N
D	3	40	1	N

Choose from one of the following:

A,B,C or D	Set drive config.	X	Exit to command level
1	Select new format F1	3	Select default TRS-00 drive
2	Select new format F2	4	Select default Alien drive

Figure 3. Configuration menu of SuperCROSS/XT.

For example, you could decide to transfer all the Basic files to the target disk—just tag all the files with a /BAS extension. A simple set of keystrokes moves the entire group of files from the source disk to the target disk.

If you exit the Tag command menu, you can reenter the menu with the previous file status. This is a blessing if you mistakenly exit too soon or want to repetitively copy the same group of files to several disks. You can also save the tag list in a file and then reload it later for batch processing.

Appendixes in the documentation provide additional information on disk formats and the conversions performed. One provides a short set of instructions on making an initial configuration file containing the features you want.

It's Great But...

Supercross is really a time-saver. Before using it, I used the RS-232 port for inter-computer data transfers, which is slow.

But all products have blemishes: The first copy of Supercross I received didn't work very well, and Powersoft was responsive in quickly providing a new release.

I still feel that Supercross has a few problems. First, if you try to access a disk with the wrong format, the system will probably hang up, requiring a reset. This often happens when you try to access an 80-track double-sided disk with only single-sided drives, for example. I can't see any reason for the system to reset to solve this problem; a simple error message would be sufficient.

The original version of Supercross would sometimes silently die while copying or formatting an alien disk. While the newer version exhibits two related problems, the reliability is substantially improved.

First of all, the disk error-handling routine is highly critical of simple problems. Supercross sometimes rejects disks that format perfectly under CP/M, TRSDOS, and MS-DOS as bad. For instance, it claimed that one disk had flawed sectors in five tracks, but I could later format this disk on the Tandy 2000 (in 80-track quad-density mode).

Supercross still periodically slips into silent death while copying files. This is the same problem I identified with the earlier version but it doesn't happen so often. It now occurs so infrequently that I can live with it.

Conclusion

The value of this program far exceeds its price. If Powersoft fixed the few problems mentioned, Supercross would be an outstanding utility. As it is, if you work with different computers, it's a must. ■

Customer Billing In a Big Way

by Wynne Keller

★★★★

Accounts Receivable Version 1.85 runs on the Model III (48K) and requires two disk drives. It also supports a hard disk drive. Holman Data Products, 2366 Lincoln, Oroville, CA 95965, 916-533-5992. \$149.95.

Hard disk version \$199.95.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

Holman Data Products' Accounts Receivable, a large-capacity workhorse for customer billing, offers all the features you need in a data manager of this type, but it fails to provide the convenience features, like error-trapping and alphabetical sorting, you'd expect in a software package today. While this doesn't detract from the program's utility, it does make it more difficult to use than it should be.

Accounts Receivable handles large files: You can fit approximately 300 customers on a disk and use up to 30 disks. While you probably wouldn't want to do that much disk swapping, the point is that the program grows with your business. If you start with one customer disk, you can continue to split the file and add disks as the need arises.

One of Accounts Receivable's unusual features is that hard disk users can write files back to floppies and use them should the hard disk fail.

Customer Data

You must enter customer data, or at least step through each field in a record, before you can exit the data entry mode. If you type in an entry in incorrect format, the program gives you an "Invalid entry" error but doesn't specify it. When you finish with a record, you make corrections by typing in the line number containing the error and retyping the line.

You can include a status code for each customer signifying anything of interest to you, such as a customer's credit rating or type of account (retail or wholesale). For example, you could request one-third of the balance due on selected statements with these codes. Other information on each customer includes the date you set up the account, interest rate (percent per month), date of last payment, and credit limit.

While you can use lowercase letters in customer records, the program doesn't

recognize them. Also, the program supports five-digit zip codes only. To help reduce errors on data entry, you can specify a range of numbers you want the data base to accept; it rejects any number outside this range.

You access customer records by account number only, rather than by customer name. Unfortunately, you can't sort records by customer name either, only by number. The manual suggests that if you need to order names alphabetically, you should assign customer numbers relative to position in the alphabet, using numbers 1-26 to start off the account number.

You can record subaccount numbers by separating them from the account number with a decimal point.

You have to have the proper customer disk in drive 1 whenever the program accesses an account. Instructions to do this appear on-screen and you must press the enter key to continue on, even if you already have the correct disk in the drive. Companies that have all their data on one disk would probably find it more helpful for the program to request a disk switch only if you had the wrong disk in the drive.

Transactions

Accounts Receivable supports 99 transaction codes to define the types of entries you make. For instance, one code represents an invoice (to charge a sale), another a payment. For each transaction, you have to supply the account number, invoice number, date, transaction code, and amount.

To make corrections, you enter the edit mode and choose one of seven options to delete, change or locate a transaction forward or backward.

You can verify the sum of all transactions before posting them to disk to ensure that you haven't omitted any. The manual wisely suggests that you don't enter more than 150 transactions in one session.

Accounts Receivable sorts transactions before posting them to keep disk swapping to a minimum. It flags and deletes any transaction with an invalid account number during the posting. You can then reenter the transaction. Holman Data Products offers an optional invoicing program. It supports a customer purchase order number (the statements do not) and posts a single-line entry to the statement transaction file. Another optional program supports discounts on statements.

Reports

You can review a customer's status on-screen, displaying old and current balances and aging. Accounts Receivable

CONVERT MOD I/III BASIC PROGRAMS and FILES For Use On The IBM PC, TANDY 1000, 1200HD, 2000

Here's time and money saving news for thousands of TRS-80 Mod I and Mod III owners who would love to move up to state-of-the-art hardware! EMSI's conversion package contains utilities to solve both problems facing those who want to upgrade:

PROBLEM 1—HOW DO I GET FROM HERE (Mod I/III) TO THERE (PC)? Do I need to retype everything, buy modems, RS232's, cables and communications software?

ANSWER: None of the above! Use the HYPERCROSS utility included with our package! HYPERCROSS makes the entire disk transfer process very simple—and fast. All the work is done right on your Mod I/III. HYPERCROSS lets you format a diskette readable by all PC's in one drive and copy files directly to it from a Mod I/III diskette. After the transfer, take the PC diskette out of your Mod I/III and put it in your PC. Simple as that! (Mod I's need a doubler).

PROBLEM 2—ONCE I'M THERE, HOW DO I CONVERT MY MOD I/III PROGRAM TO RUN ON A PC?

ANSWER: Use our CNV3TOPC utility to do 95% or more of the conversion for you. It automatically inserts all required spaces between keywords, replaces PRINT@'s (even those with variables) to LOCATE's, adjusts TAH addresses, corrects the exponentiation symbol, replaces the % symbol in USING statements with a backslash, removes down arrows, optionally removes REM's and flags and lists unresolved line numbers. It even allows for Mod I/III screen PEEKs and POKES.

And, Our thirty page user guide is packed with examples and hints showing how to make any manual program changes required after using CNV3TOPC.

So, there you have it. HYPERCROSS gets you "over there" and CNV3TOPC performs most of the required program changes. Sound too good to be true? Don't take EMSI's word for it. Here are excerpts from two magazine reviews. Note that since publication of these reviews, CONV3TO2000 V1.0 has been enhanced and consolidated with CONV3TOPC V1.0 into one package, namely, CONV3TOPC V2.0

"...Its the best such program I've seen, well worth its higher price over similar programs...The conversion program performed flawlessly. CONV3TO2000 works so well it merits the \$139.95 price tag...."

Mr. Gary Shade, 80 MICRO, May 1985 (4½ stars).

"The documentation is a very strong asset to this package...More software producers should put out documentation like this...NICE JOB BY EMSI!..."

Mr. Lon Andrews, COMPUTER SHOPPER, December 1984.

Customer comments:

"Truly, a Superior Quality Software Package. Count me among your list of satisfied customers."
Waltham, MA

"I would gladly recommend the package to anyone making the change to an IBM type machine." *"The fine points of conversion you cover in the manual are excellent."*
Wauwatosa, WI Salem, OR

"What a time saver. Thanks for a great product."
Denver, CO

"An excellent product. Thank you for the service."
Mapa, CA

"Excellent Software, Outstanding Support."
Wyncote, PA

"Works like a charm! Congratulations."
Odenton, MD

CONV3TOPC V2.0 \$139.95 AVAILABLE WORLDWIDE

AT OVER 2000 RADIO SHACK COMPUTER CENTERS AND PARTICIPATING DEALERS

For your ordering convenience, CONV3TOPC V2.0 is available through Radio Shack's EXPRESS ORDER SYSTEM—

Catalog # 90-0345. Please order through your local Radio Shack store.

\$20 REBATE! The first 100 CONV3TOPC V2.0 customers who send EMSI a copy of their Radio Shack sales ticket with their Software Registration Card will receive a \$20 cash rebate directly from EMSI.

If it is not possible for you to purchase CONV3TOPC through Radio Shack or another authorized dealer, you may order directly from EMSI by calling TOLL FREE (except NJ)

800-922-0786

(NJ residents 201-879-5982)

EDUCATIONAL MICRO SYSTEMS, INC.
PO Box 471, Chester, New Jersey 07930



EMSI direct order terms: VISA, Mastercard, MO, check or COD. Add \$3.00 shipping/handling. Add \$1.90 for COD. Foreign or first class, add first class postage (package wt. 2½lbs.). NJ residents add 6% sales tax.



offers an option to calculate finance charges, too. Each account can have a different percentage rate for interest, no rate at all, or you can set a minimum dollar amount for finance charges. You can rerun this option if necessary without posting the finance charges twice.

Aging reports offer several options, including active accounts, zero balance only, credit balance only, over credit limit, and past due. You can invoke the options for all customers, a specific range, or dollar totals. You print out the reports according to the most recent end-of-month status or, if 15 days or more have elapsed since the end-of-month, you can age the balances.

Accounts Receivable prints statements on standard 7-inch invoice forms or on regular paper. As with aging reports, you can do all or selected accounts, and restart a complete run at any selected account.

You can print statements by aging category and optionally print zero- or credit-balance statements. You can also select printouts by status code; if you coded your customers as retail and wholesale, you might print all the retail or all the wholesale clients separately.

The program even prints mailing labels in case you don't use windowed envelopes. Here again, your choices are flexible, including status code, range of zip codes, and range of account numbers. You can even select the number of lines per label if you use nonstandard labels. The only thing missing is an option to use two- or three-across labels.

End-of-Month Updates And Utilities

At the end of the month, run the update program to erase the transactions and update balances. This also generates an audit report.

The utility programs help with specialized problems, like splitting the file when a disk becomes full. One utility clears all transactions and another deletes selected transactions. The utilities aren't as easy to use as the main programs. You must, for example, add 50 to the disk number when asking the system to scan a customer disk; if you enter the wrong number you can't cleanly escape.

Conclusions

The trend in software these days is toward hard drives and you'll find little software available for large files on a floppy system. Certainly using Accounts Receivable entails some disk swapping, but it minimizes this as much as possible. The screen-editing features aren't state-of-the-art nor is the error-trapping, but the program can do a big job inexpensively and is well worth investigating. ■

The Enhancer

by David B. Dalton

★★★★★

Supermod4 runs on the Model 4 (64K). Intellitech Corp., formerly Intelligent Technologies Co., 21 Campbell Drive, Dix Hills, NY 11746, 516-462-6970. \$49.95

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

If you use a Model III DOS even though you moved up to a Model 4, you don't have to sacrifice the 4's increased capabilities: You can choose from a number of programs that give you the Model 4's extra power in Model III mode. Supermod4 is the best one I've seen.

In Model III mode, Supermod4 enables an 80-character by 24-line screen, speeds up the processor from 2 megahertz (MHz) to 4 MHz, spools text and data to your printer, and activates an audible key click through the 4's built-in speaker. And Supermod4 eats up no user memory, even for the printer spooler; every Model 4 has at least 16K of memory not normally accessible in Model III mode, and that's where Supermod4 resides.

Using Supermod4

You can select a number of options when you call up Supermod4, including those for screen size, 4 or 2 MHz operation, the printer spooler, an audible key click, clearing or resuming spooler operation (with no data loss, even during a reboot), or canceling the program.

In addition, you can assign any keyboard character or any other ASCII character to the Model 4's three function keys. Unfortunately (and this is one of my few disappointments with Supermod4) the function keys can be programmed only for one character. It would be nice if they were macro keys so that each function key could be used for an entire string of characters, such as a commonly used command.

One of Supermod4's nicest features is its printer spooler. It's the only I've seen that's both useful and easy to use. The spooler uses up to 14K of the Model 4's invisible memory. If you want to print out a Basic program of fewer than 14K, you regain control of the computer immediately when Supermod4 loads the program into the spooler. The printer may slow down a little if the computer is busy; it slows down quite a bit if you read from or write to a disk.

Like most spoolers, this one has some limitations. It works only with the Model 4's built-in printer routines; that in-

cludes listing and printing from Basic. Consequently, most word processors won't work with the spooler because they use their own printer routines.

Video

Supermod4 works with all the video formats available on the Model 4: 80 characters by 24 lines, 40 by 24, 64 by 16, and 32 by 16. It automatically corrects most problems that arise from using a Basic program written for the Model III's 64-character by 16-line display. For instance, it automatically corrects the Basic statements PRINT@, PRINTTAB, POS, Set, Reset, and Point. It also lets you use reverse video. In Basic, printing a CHR\$(16) enables reverse video, and CHR\$(17) or CLS turns it off.

Supermod4's video features work only with programs that use the built-in video drivers. This includes, of course, programs written in Basic or compiled programs written in languages such as Pascal or C. Many Assembly-language programs also use the built-in video drivers and work fine with Supermod4.

Unfortunately, most word processors use their own video routines and won't work with Supermod4 (Scriptit and SuperScriptit, for example). In Basic, PEEKs or POKEs directly to the video RAM won't work correctly, either.

You'll have to test your favorite programs to see how they work with Supermod4. I found that Micro-Systems' Microterm, one of my favorite terminal programs, works fine with Supermod4 even though its menu is a bit skewed on the 80 by 24 screen. I had no problems with Aspen Software's Grammatik, either. Even eSoft's The Bread Board System (TBBS) bulletin board software, which is complex, works well.

All the NEWDOS/80, LDOS, and DOSPLUS functions (such as directories) look fine on the 80 by 24 screen. TRSDOS, though, directly addresses some of the video memory, and its directories don't look pretty.

Configuration

Supermod4 works under TRSDOS, LDOS, and DOSPLUS, but it was developed and works best under NEWDOS/80.

Supermod4 comes on an unprotected TRSDOS data disk. The current version won't work on the 4P, but Intellitech says that a 4P version is in the works.

Conclusion

Supermod4 has become almost as essential to me as my DOS. When I'm not working on my computer, I use it as a TBBS bulletin board. I've had Supermod4 running almost full-time on the BBS for many weeks and it hasn't malfunctioned yet. ■

Little Brother, Little Price

by Hardin Brothers

★★★★☆

Little Brother runs on the Model 4/4P (64K with one disk drive and a hard disk or 128K and two disk drives) and the Tandy 1000 and 1200 (128K and two disk drives, or one drive and a hard disk). Logical Systems Inc., 8970 N. 55th St., P.O. Box 23956, Milwaukee, WI 53223. \$99.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

Little Brother is a new data base program for the Model 4 and the Tandy 1000 and 1200. While it's similar to the Profile data bases available from Radio Shack, it costs considerably less and offers a lot of versatility in such an inexpensive program. But the documentation is disorganized and it requires some disk swapping if you don't have large capacity drives or a hard disk drive unit.

Getting Started

Defining and using a data base file is relatively simple, considering the number of options available. You start by defining fields for your data base records. Then you define one or more input screens and one or more report or label forms. When you finish, you can begin entering information into your data base.

The Data Fields

Little Brother recognizes nine different types of data fields. Text fields comprise alphabetic, uppercase alphabetic, literal, or uppercase literal characters. Only literal and uppercase literals allow numbers and punctuation.

You specify numeric fields as left- or right-justified standard types or as dollar or floating-point types. The standard types allow numeric input of any length (up to 254 characters), the floating-point type allows up to eight places on each side of the decimal point, and the dollar type allows a maximum of eight places to the left of the decimal point.

You can also define calculated fields, where input derives from mathematically manipulated constants or numeric values from elsewhere in the data base.

Each field label in the data base holds up to 254 characters, except for dollar and floating-point numeric fields. You can define a maximum of 64 fields per record, each with a maximum of 1,024

characters, and save up to 65,534 records per data base (if your disk can hold that much).

The Input Screen

After you define the fields, you create an input screen, the template where you'll enter data. Each input form must fit in the top 22 rows of a single video screen, and you can mix data input fields and normal and inverse text. Little Brother reserves the screen's bottom two lines for its own use.

Once you define the input screens, you can begin entering data. Be sure that everything is the way you want, because you can't redefine the field formats.

Little Brother exhibits one peculiarity during data entry. When you finish entering information in one field and press the enter or return key, the cursor doesn't move to the next field on the form. Instead, it moves to the next field that you input when you initially defined the fields. Consequently, you should define the fields in the order that you will want to enter data.

Reports and Indexes

You can define up to 10 report or label formats to print out your files. While you can use up to 20 lines for each report, you can also use information from your data base in a full-page form letter, as long as the letter's not too wordy.

One of Little Brother's nicest features is the variety of reports it can produce. Unlike some other data-handling programs, Little Brother doesn't assume that you'll always want to generate columnar reports. You can print out each report on a separate page, print each record more than once, and print multiple reports per column.

Like most other data base programs, you can sort or select records based on up to eight fields and store an ordered list of the files in one of five special disk files.

Little Brother also provides an unusual type of index, called an add index. If you enable the add index while entering data, the program automatically sorts records as you enter them. You can then use the add index to quickly retrieve records in a predetermined order. However, the add index only sorts newly entered records; it ignores all other information.

You can create a job file to automate your keystrokes for performing various tasks, such as sorting your data base or printing out information. First, tell the program that you want to create such a file and give the file a name. Then, perform the procedure you want to automate. Every key you press will be echoed to the job file. You can later use the job file by specifying its name either from within the program or in the command line when

you call up Little Brother from DOS.

Little Brother stores its files in ASCII format, padded with zero bytes. This way, you can use the data in other programs. For example, you could easily write a Basic program to read your files and manipulate them in ways that Little Brother can't.

Problems

Generally, I like Little Brother. However, it has some problems that may make it unsuited to some applications. If you use it on a two-drive Model 4, you'll feel cramped for disk space. You have to store all your data, as well as your input screens, report forms, and index files, on a single disk. A hard disk is almost mandatory to use Little Brother with a large data base, unless you want to constantly swap disks.

Although the add index is handy, it should let you use previously entered data with it. It's useless if you start using it while in the middle of adding information to a file, or if you forgot to turn it on when you started the data entry session.

Little Brother's weakest feature is its documentation. The manual is both disorganized and confusing. For example, the first thing you must do with a new data base is define fields, but the manual doesn't discuss this until page 59, after it tells you how to define input screens and report formats. To add to the confusion, the descriptions of screen and print formats both assume that you have already defined your data base's fields and understand that topic well.

Once you learn how to use Little Brother, the manual is only fair as a reference, since it lacks an index as well as any clear quick-reference charts.

The documentation is supplemented by on-line help which is more clear than the printed documentation, but tends to be too wordy. I finally dumped the help screens to my printer and used them instead of the manual to teach myself the system.

One other problem that two-drive Model 4 owners will face (which, unbelievably, the documentation doesn't discuss) is how to correctly use the separate creation and run-time disks. Nothing tells you which disk should be in your system for which functions.

Conclusions

Despite its documentation problems and its unwieldy nature, Little Brother is a good value compared to other similar programs. It doesn't have all the bells and whistles of Profile 4, but it works well and I didn't find any bugs. If you have the patience to learn the program, you will find that it is a good choice to manage a moderately sized data base. ■

Continued on p. 100

Picture this on a \$2,500 CAD program.

When Ultracam Incorporated set out to design the Ultracam™ K35, they knew that their design tool needed to be as professional as the camera they were designing. That's why they chose AutoCAD,™ the most widely used computer-aided design and drafting tool in the world today.

Mainframe CAD Capability at 5% of the Price

If you have an IBM PC, PC/XT, PC/AT, NEC, DEC, TI, Tandy, Wang, or one of over 30 desktop computers AutoCAD supports, you already own the most expensive part of a CAD system. Add AutoCAD for only \$2500 more, and you can have the power of CAD on your desktop at a price you can afford. With a pointing device and a plotter (the choice is yours, we support over 50 popular peripherals,) you can assemble a complete CAD workstation for less than \$10,000.

Once you've installed AutoCAD on your computer, you'll have a tool at your fingertips which removes the drudgery from designing.

Quick to Learn, Easy to Use

The beauty of AutoCAD is that you need no prior knowledge of computers. Even if you've never seen a CAD system, you'll pick it up in a matter of days, and feel comfortable within a week.

Simple pop-up menus point you in the right direction. You can also easily create your



own menus. On-line HELP keeps you on track.

Sailboats, Landscapes, and Custom Homes

Since AutoCAD is general-purpose and user-customizable, it doesn't matter what type of drafting your work requires.

Ultracam K35 is a trademark of Ultracam Incorporated. AutoCAD, CAD/camera and AE/CADD are trademarks of Autodesk Inc.



Camera designs provided courtesy of Ultracam Incorporated.

Tens of thousands of AutoCAD users are creating drawings and developing designs in every discipline with ease and accuracy never experienced before.

The Heart of Your CAE System

Drawings are only part of the story. Pre-defined standard symbols, translators to allow AutoCAD to exchange drawings with mainframe CAD systems, data base analysis programs for bill of material lists, job costing and drawing distribution by telephone are only some of the capabilities available with AutoCAD. These capabilities make AutoCAD the central component in your desktop computer-aided engineering (CAE) system.

Whether you're in a two-person shop or a two-billion dollar company, you'll find that AutoCAD pays for itself in just a few months.

In the future, AutoCAD will run on newer, more powerful computers as they become available—so that you can be sure your investment in creating drawings and training staff won't be wasted.

Powerful New Capabilities

Call or write us today for the name of the dealer nearest you and a demonstration of the latest in AutoCAD capabilities, including polylines, curves, and 3D visualization with hidden line removal. Also ask about other cost-effective Autodesk products: AE/CADD™ and CAD/camera™.

AutoCAD, world leader in design and drafting software, will save you time and money.



AUTOCAD™

AUTODESK, INC.

2320 MARINSHIP WAY
SAN ALITO, CA 94965

(415) 331-0356

or (800) 443-0100 EXT. 406

TELEX 275946 ACAD UD

Circle 275 on Reader Service card.



You *Can* Get There from Here

The most common question computer users ask these days is, "How do I get data from one computer to another?"

Consider these scenarios:

- ▶ You have a file you want to share with someone else in your office.
- ▶ A friend has a Basic program on his Model 2000 that you'd like to use on your Model 4.
- ▶ You've got a Model III at home, and you want to use your word processing files on an IBM PC or PC-compatible at work.

Unfortunately, you can't simply take a disk out of the first computer, pop it into the second, and boot up a program; you might just as well try starting your car with a house key.

Even though the microcomputer industry is 10 years old, we're still light years away from a standard that will let you interchange disks as you can records or compact discs. Nearly every computer has its own disk operating system and disk format—if it uses disks at all. Even if you have identical hardware, you might run into major problems, as anyone who has tried to move a file from DOSPLUS 3.4 to LDOS will tell you.

Nevertheless, you *can* transfer files between machines, and with a minimum of pain. Given the right hardware and software, you can send data back and forth as if it were second nature.

In this article, I'll discuss three methods of file transfer: direct, remote, and software. I'll cover the pros and cons of each, and give you a way to solve the three problems mentioned above.

I won't discuss how to transfer data from one software package to another, however; that's in *80 Micro's* next issue. I'll limit myself here to taking information from a disk formatted on one kind of computer and putting it on a disk formatted for another kind.

They Went Data Way

Before going any further, consider some of the fundamentals of how computers send and receive data. At the heart of file transfer is the American Standard Code for Information Interchange (ASCII). ASCII uses a standardized system by which it represents characters. For instance, it stores the letter "A" as the decimal number (or ASCII code) 65, the number "1" as 49, and the question mark as 63. Nearly

all popular computers store data according to this system.

In most cases, you want to use ASCII code when transferring files; it ensures that both computers speak the same language. The first computer sends a string of ASCII numbers, and the second one receives them. When you retrieve the file—with, say, a word processor or data base manager—the computer translates the ASCII number back to the original character it represents.

You should be aware, however, that even this "standard" has its problems. Note in Table 1 that the printable characters run from 33–127. The first 32 are reserved for special codes, and not all computers use these codes in the same way. For instance, 29 represents a line erase on the Model 4, and moves the cursor left on the IBM PC. A 7 emits a beep on the PC, but has no function on the 4.

Then there's the extended (non-ASCII) character set. I won't get bogged down in details here, but the computer can assign special characters to the decimal numbers 128–255. These characters vary widely from computer to computer.

Despite these obstacles, the ASCII set can make your life a lot easier when you need to move a file.

Directing Traffic

Direct file transfer is the fastest and most reliable of the two hardware solutions. As the name implies, you link two computers together directly. The tools you need are RS-232 ports on both computers, an RS-232 cable, a null modem adapter, and terminal software.

Using the direct file transfer method, you can transmit data from one machine to another at rates of up to 2,400 baud. This is twice the transmission speed of most modems, which transfer data over phone lines. The relatively short length of RS-232 cable used to link the computers provides minimal electrical resistance to the data signal, and the absence of external static ensures reliable, nongarbled data.

As mentioned above, direct transfer requires that both computers have RS-232 ports. An RS-232 port is a 25-pin connector whose specifications, established by the Electronic Industries Association (EIA) in 1969, are designed to standardize the way in which computers send and receive



Everything you need to know about moving files from one computer to another.

by Bradford N. Dixon

ASCII code (decimal)	Video display	ASCII code (decimal)	Video display	ASCII code (decimal)	Video display
32	BLANK	64	@	96	
33	!	65	A	97	a
34	"	66	B	98	b
35	#	67	C	99	c
36	\$	68	D	100	d
37	%	69	E	101	e
38	&	70	F	102	f
39	'	71	G	103	g
40	(	72	H	104	h
41	)	73	I	105	i
42	*	74	J	106	j
43	+	75	K	107	k
44	,	76	L	108	l
45	-	77	M	109	m
46	.	78	N	110	n
47	/	79	O	111	o
48	0	80	P	112	p
49	1	81	Q	113	q
50	2	82	R	114	r
51	3	83	S	115	s
52	4	84	T	116	t
53	5	85	U	117	u
54	6	86	V	118	v
55	7	87	W	119	w
56	8	88	X	120	x
57	9	89	Y	121	y
58	:	90	Z	122	z
59	;	91	[	123	{
60	<	92	BLANK	124	|
61	=	93	]	125	}
62	>	94	^	126	~
63	?	95	_	127	±

Table 1. Values for ASCII codes 32-127.

Pin	Signal	Direction
1	Earth ground	
2	Transmitted data	To DCE
3	Received data	To DTE
4	Request to send	To DCE
5	Clear to send	To DTE
6	Data set ready	To DTE
7	Logic ground	
8	Carrier detect	To DTE
9	Reserved	
10	Reserved	
11	Unassigned	
12	Secondary carrier detect	To DTE
13	Secondary clear to send	To DTE
14	Secondary transmitted data	To DCE
15	Transmit clock	To DTE
16	Secondary received data	To DTE
17	Receiver clock	To DTE
18	Unassigned	
19	Secondary request to send	To DCE
20	Data terminal ready	To DCE
21	Signal quality detect	To DTE
22	Ring detect	To DTE
23	Data rate select	To DCE
24	Transmit clock	To DCE
25	Unassigned	

Table 2. Pin assignments for RS-232 port.

data. When you connect two RS-232 ports with an RS-232 cable, you're ensuring that one computer can transmit information in such a way that another computer can easily accept it. Table 2 lists the pin assignments of a standard RS-232 cable.

Within Tandy's line of computers, the Models 11, 12, 100, 200, 2000, and 6000 come with an RS-232 already installed. The Model III/4 RS-232 board and cable (catalog number 26-1148) costs \$99 and should be installed at a Radio Shack Computer Center. The Tandy 1000 and 1200HD use identical RS-232 boards; they cost \$99.95 apiece and you can install one yourself.

An RS-232 cable (catalog number 26-1048) costs \$19.95, and the null modem adapter (catalog number 26-1496) is \$29.95. You can also make your own null modem cable; a tutorial in February 1984's C*Notes ("Pin Pals," p. 194) tells you how.

Unfortunately, like the ASCII code, the RS-232 standard has its variations. In fact, the EIA has approved 13 such "standards." The most common version is the RS-232C, which most major brands of mi-

Let's Talk

Good Software
12900 Preston Road
Dallas, TX 75230
214-239-6085

File Transfer

Personal Computer Products
1400 Coleman Ave., Suite C-18
Santa Clara, CA 95050
408-988-0164

Microlink II

B.T. Enterprises
10 Carlough Road
Bohemia, NY 11716
516-567-8155

Omniterm

Lindbergh Systems Inc.
49 Beechmont St.
Worcester, MA 01609
617-263-5049

Microterm

Micro-Systems Software Inc.
4301-18 Oak Circle
Boca Raton, FL 33431
305-983-3390

DeskMate

Videotex Plus
Tandy/Radio Shack
One Tandy Center
Fort Worth, TX 76102
817-390-3011

Supercross/XT

17060 Dallas Pkwy.
Suite 114
Dallas, TX 75248
1214-733-4475

Table 3. Manufacturers' addresses.

Powerful Programming Tools At Bargain Prices

C compiler

for the model 1 or 3 using
TRSDOS, LDOS, NEWDOS,
DOSPLUS, or MULTIDOS;
includes full screen text editor and
advanced development package

List Price ~~\$250.00~~

Sale Price \$89.95

Multi-Basic compiler

for the model 1 or 3, or 4 using
TRSDOS, LDOS, NEWDOS,
DOSPLUS, or MULTIDOS;
includes full screen text editor and
advanced development package

List Price ~~\$250.00~~

Sale Price \$89.95

This is a full K & R standard implementation of C that includes a Unix compatible function library. The package also includes a 450 page manual with a tutorial on using the C language. If you've been wanting to learn C, this is the package you need.

Features Include

char	8 bits	initializers
short	8 bits	typedef
int	16 bits	static
unsigned	16 bits	auto
long	32 bits	extern
float	32 bits	struct/bit fields
double	64 bits	union

Execution speed on the Model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 284.

LC Compiler	105 secs.
Alcor C	78 secs.

Special Bonus

Buy one version for \$89.95 and get the version for the other model for only \$21.

Multi-Basic is a TRS-80 BASIC compatible compiler. The Model 4 version supports everything in the TRSDOS 6 BASIC interpreter except the COMMON statement. The same support is provided in the Model 1 and 3 versions so programs are portable. The CMD statement is the only statement from the Model 1 and 3 BASIC interpreters that is not supported.

Multi-Basic also supports advanced language features like multi-line procedures and functions, recursion, and dynamic string management (no long pauses for garbage collection).

Execution speed on the model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 286.

BASIC Interpreter	4570 secs.
Multi-Basic	89 secs.

Special Bonus

Buy one version for \$89.95 and get versions for the other two models for only \$21 each.

Sale Price Extended Through October 31

C Compiler

Circle version(s) Model
1 3
One version (\$89.95) _____
Both versions (\$110.95) _____
Add 6% sales tax (Texas only) _____
Shipping \$6 USA/\$28 foreign) _____
Total _____



1132 Commerce Systems
Richardson, TX 75081
(214) 238-8554

Circle 215 on Reader Service card.

Name _____
Street _____
City _____
State _____
Zip _____
Country _____
Phone _____

Also available for CP/M & MSDOS
\$89.95 each

MC ☐ Visa ☐ Money Order ☐ Check ☐ COD ☐

Card # _____ exp _____

Multi-Basic Compiler

Circle version(s) Model
1 3 4
One version (\$89.95) _____
Two versions (\$110.95) _____
Three versions (\$131.95) _____
Add 6% sales tax (Texas only) _____
Shipping \$6 USA/\$28 foreign) _____
Total _____

Multi-Basic is a trademark of Alcor Systems.
TRS-80 is a registered trademark of Tandy Corp.
MSDOS is a trademark of Microsoft.
CP/M is a trademark of Digital Research.
Unix is a trademark of Bell Laboratories.
LC is a trademark of Misoys.

Fast80 BBS

by Patzsch

What makes Fast80 really unique, is that the entire user file and message base are in memory - the result?

MINIMAL DISKETTE WEAR!

You can configure your Fast80 system so it hardly ever goes to disk. Think of the diskette savings! What's more, Fast80 is written entirely in machine language and with all data in memory that makes Fast80:

THE FASTEST BBS IN TOWN!

Fast80 uses a 128K Model 4 running TRSDOS or DOSPLUS and supports a full range of auto-answer modems. Diskette savings alone will pay for a memory upgrade if you currently only have 64K.

Fast80 supports 445 users and 120 messages and provides all the BBS functions you're familiar with: upload/download capability - chat mode - sysop configured system messages, alternate message board etc!

See Fast80 in action - call the SOTA RR at (604) 688-5009 (6PM - 8AM - 7 days a week)

There are four Model 4 BBS's in the Vancouver area and every one of them runs Fast80 - the reason? Fast80 is simply the most powerful, most affordable bulletin board system ever offered. If you're already a sysop, why not give your users a treat! Run Fast80 - the favourite of users and sysops alike! Fast80 - only \$59.95 from SOTA Computing Systems Limited.

FORTH

figFORTH from SOTA Computing Systems Limited is rapidly becoming the FORTH of choice for both the novice and experienced FORTH programmer. Featuring a complete accurate implementation of the figFORTH model we offer both a CP/M and native mode version. The native mode is fully compatible with TRSDOS, LDOS, DOSPLUS and HEVDOS. Both versions offer these exciting extras:

- full featured string handling • variables • system calls • floating point • responses • patches • random access to messages • good • compact time tables • manual • support files for most of popular • and many more features.

For the best implementation of FORTH that money can buy at a truly affordable price -- order figFORTH from SOTA Computing Systems Limited today!

SAVE \$15.00

On October 1st, 1985 the price for figFORTH will be increased to \$89.95. Order NOW and you can have the complete figFORTH system for only \$74.95.

ORDER FORM

☐ I want the fastest BBS on the block - send me a copy of Fast80 for my 128K Model 4 (\$59.95)

☐ Please rush me a copy of figFORTH for the TRS-80 computer I have indicated (\$74.95)

OModel I OModel III OModel 4 OModel 4P

☐ I use CP/M - rush me a copy of figFORTH for the CP/M version I have indicated (\$74.95)

OCP/M from Radio Shack (CP/M Ver 3.2x)

OCP/M Ver 2.2x (Montezuma Micro etc)

Enclosed is my ☐ Check ☐ money-order ☐ TOTAL

Bill my ☐ VISA ☐ MasterCard ☐ US funds

NAME: _____

STREET: _____

STATE: _____ ZIP: _____

CARD TYPE: _____ EXPIRY: _____

CARD NO: _____

SIGNATURE: _____

ORDER TODAY 213-1080 Broughton Street
Vancouver, British Columbia
Canada • V6G 2A8

**ORDER BY
MAIL OR
BY PHONE**

(604) 688-5009

State of the Art since 1981

SOTA

Computing Systems Limited

TRS-80, TRSDOS, LDOS, CP/M and CP/M Plus are registered trademarks of Radio Shack, Radio Shack, Logical Systems Inc., Digital Research and Digital Research respectively.

crocomputers use. The RS-232C works with all operating systems, so you can link your Model 4 to any other micro as long as it also uses an RS-232C port.

You'll also have to connect one of the computers to the cable with a null modem adapter (see the Photo). This simply crosses the send and receive lines in the cable so the two machines can communicate. Without the null modem, the sending computer wouldn't know when to send another character and the receiving computer can't tell the sender it's ready for more.

Now for the software. Both computers will need terminal programs to send and receive data in a mutually acceptable format (word length) and at a mutually acceptable speed (baud rate). You can choose between two types of terminal packages—one that's designed specifically for direct transfer or one that handles both direct and remote transfers. Direct-transfer software is, as you might expect, more efficient than a dual-purpose package, but it isn't as flexible. Which one you choose depends on your needs and budget. The advantage of direct-transfer software

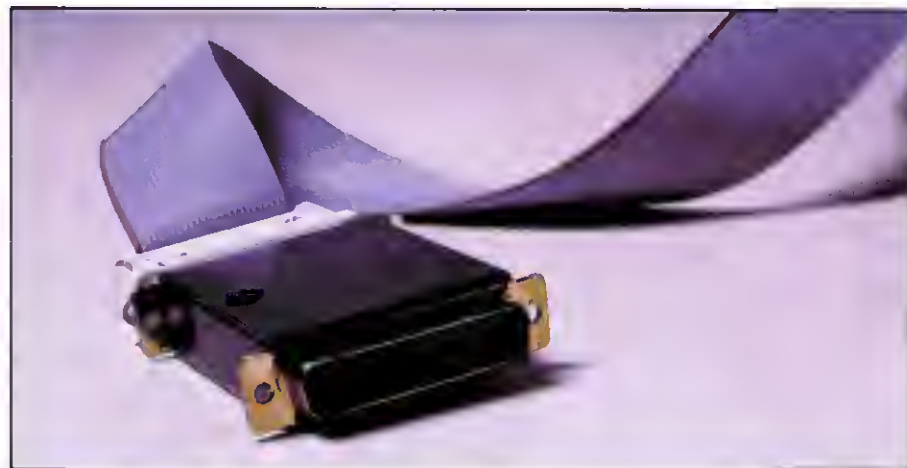


Photo. Null modem adapter.

IBM PC

PC/MS-DOS 1.1
PC/MS-DOS 2.X
PC IBM 5550 Japan
DEC Rainbow
Tandy 2000
Televideo 1603

CP/M

Aardvark
Access Matrix
Access II
Altertext
Altos
Ampro Little Board
ATR 8000
Avatar
CCS
Cliffer 2683
Columbia
Cromemco Z-2
Cromemco
Cromemco CDOS
DEC VT180 Robin
DEC Rainbow
Eagle
Epson
Epson QX-10
Florida Graphics
Gemini
Group III
HP 125

IBM PC CP/M-86

Idea Bitelex
Kaypro II
Kaypro 4 & 10
LNW80/Team
Lobo Max-80
Lobo Max-80 CP/M 3
Micral 9050
MicroBee
Monroe 2000
Morrow MicroDecision
Morrow
NCR Deciston Mate
NEC PC-8001
NEC PC-8801
Northern Tel 803
Octopus
Olympia ETX II
Olympia EX 100
Osborne I
Osborne I Executive
Osmosis
OSM Zeus
Otrona
Pied Piper
PMC-101 CP/M 3.0
Reynolds TC1000
Sanyo 1000
Sanyo 2000
Sanyo 1250
SD Computers

Sharp YX3200

Superbrain
Superbrain D
Systel II
Teletex System Master
Televideo 802
Televideo 1603
Texas Instruments
Toshiba 100/200
TRS-80 Model I CP/M
Lifeboat CP/M 1.4
FED
Omikron
TRS-80 Model III CP/M
Holmes VID-80
Hurricane Compactor
MM SHUFFLE Board
TRS-80 Model 4 CP/M
Montezuma Micro CP/M 2.2
Radio Shack CP/M Plus
Zorex 820-II
XOR-100
Zenith-Heath H89
Zenith-Heath Z90
Zenith Magnolia
Zenith Z100
Zorba
Zorba Z2000
Zorba Q
Zorba Z2000A

Table 4. Formats available on Supercross/XT.

The Perfect Host

by Bennett Shulman

You can put your Model 4 in host mode so that it accepts ASCII files at rates of up to 2,400 baud by using Memdisk. My examples use the Model 100 or 1000 as the terminal, but the principles apply to any computer with the proper terminal software.

First, connect the two computers with an RS-232 cable and null modem adapter. Set the terminal computer's parameters using the following procedures:

For the Model 100, enter Telecom and press the F3 key. Enter 67E1E after the STAT prompt. The "6" configures the 100 for 2,400 baud, while the "7E1E" sets it for 7-bit words at even parity, 1 stop bit, and XON/XOFF protocol enabled. Now put the 100 in terminal mode.

On the Model 1000, boot up DeskMate and enter Telecom. From the menu, choose 2,400 baud, 7-bit words, even parity, and 1 stop bit. Press the F7 key to save this configuration. Be sure to add the .LOG extension to the file name so you can hereafter call the parameters directly from DeskMate's menu. Put the 1000 in terminal mode.

Now you need to set up the 4 as a host. You normally type in LINK *DO *CL and then LINK *KI *CL at TRSDOS Ready (DO stands for "device output," CL for "communications line," and KI for "keyboard input"). Since TRSDOS lets you copy files to devices and devices to files, you should be able to copy *CL to File/DAT:0 and upload from the terminal. Unfortunately, the Model 4 can't keep up the pace, even at 300 baud. The solution is Memdisk.

Using a word processor or the Build command, create the job control language (JCL) file in the Program Listing. Name it Host/JCL. Reset your computer and, using the Do command, run the JCL file. When the file ends, you'll see the message "Job done" on both computers. Here's what Host/JCL does:

The System command begins to install Memdisk as drive 2. "A" selects the top half of user memory to locate Memdisk. If you have 128K, you can replace the "A" with "B," "C," or "D," which will select bank 1, bank 2, or both. "D" selects double-density. "5" is the number of cylinders, which will be 4.5K each for a total of 22.5K. "Y" tells the computer to format the disk.

The Set command installs the forms filter program.

The Forms command selects options in the filter program. The computer sets a line width of 40 characters and sends a line feed with each carriage return. This permits proper screen width

and scrolling on the Model 100. For the 1000, set the line length for 80 characters, and eliminate the ADDLF option. The next Set command installs the communications driver and links it to the RS-232 port. The SETCOM command sets the baud rate to 2,400.

The Filter command filters the RS-232 port output as set by the Forms command, and the two Link commands link the screen (DO) and keyboard (KI) to the RS-232 port.

Time to Upload

Now follow these steps on your Model 100 or 1000:

First, type in CREATE FILE/DAT:2 (SIZE = 16). This creates an empty 16K file on your Model 4 Memdisk.

Type in COPY *CL TO FILE/DAT:2. This opens File/DAT and copies the *CL to it until you enter control-C. The message "Copying *CL to File/DAT:2" appears on both screens when the Model 4 is ready to receive. Don't use the Copy command's echo option; it will slow the transfer and possibly lose data.

At this point, upload your data from the terminal, then press control-C.

Now type in COPY FILE/DAT:2 :1 on the terminal. This copies the files from Memdisk to the disk in drive 1. Finally, type in REMOVE FILE/DAT:2 to remove the file from Memdisk.

When you first use this method, carefully check the files received. If they aren't exactly what you send, reduce the baud rates on both computers until the files arrive intact. ■

Write to Bennett Shulman at 1414 W. Shtawassee St., Lansing, MI 48915.

Program Listing. Host/JCL.

```
SYSTEM (DRIVE=2, DRIVER="MEMDISK")
A
D
5
Y
SET *FF TO FORMS/FLT
FORMS (CHARS=40, ADDLF)
SET *CL TO COM/DVR
SETCOM (BAUD=2400)
FILTER *CL *FF
LINK *DO *CL
LINK *KI *CL
//EXIT
```

System Requirements

Model 4
64K RAM
TRSDOS 6.X

Mac Inker

Re-ink any fabric ribbon **AUTOMATICALLY** for less than 5¢. Extremely simple operation with built-in electric motor. We have a **MAC INKER** for any printer: cartridge/spool/harmonica/zip pack. Lubricant ink safe for dot matrix printheads. Multicolored inks, uninked cartridges available. Ask for brochure. Thousands of satisfied customers.

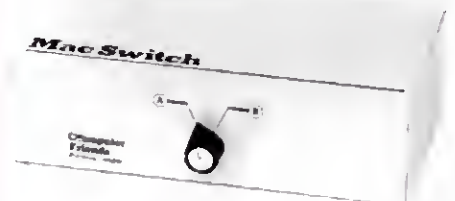
\$54.95 +



Mac Switch

Mac Switch lets you share your computer with any two peripherals (serial or parallel). Ideal for word processors—never type an address twice. Ask us for brochure with tips on how to share two peripherals (or two computers) with MAC SWITCH. Total satisfaction or full refund.

\$99.00



Order toll free 1-800-547-3303

Computer Friends

6415 SW Canyon Court
Suite #10
Portland, Oregon 97221
(503) 297-2321
Dealer inquiries welcome

is its ease of use. You don't need to worry about buffer controls, DOS commands, optional transfer protocols, or making selections from extensive menus. All you do is set the sending computer and the receiving computer to the same transfer parameters and let the software do the rest.

If you own a Model 100, 200, or 1000, you get a terminal program that lets you send and receive files directly or remotely. The 100 and 200 come with Term in ROM, while the 1000's terminal program, called Telcom, is part of the DeskMate package. (DeskMate is also available for the Models 1200 and 4.) With Term, you can directly transfer data at speeds ranging from 75 to 19,200 baud.

The Model 4 doesn't come with a terminal program, but the *Disk System Owner's Manual* tells you how to configure the RS-232 so you can use the 4 as a terminal. Pages 1-34 through 1-46 list the key combinations for direct connections to another computer and via a modem for telephone communications. The documentation is, however, difficult to follow. Bennett Shulman's sidebar on page 41 gives some simple instructions for using the direct method of data transfer at high speeds.

If you're only going to send data directly through an RS-232, several packages are made specifically for that job. Good Software's Let's Talk, for instance, comes with disks formatted for the Model III/4, IBM PC/Tandy 1000, Tandy 2000, and Model II/12/6000; moving information between any combination of these machines is a snap (see Table 3 for a list of manufacturers' addresses).

File Transfer, from Personal Computer Products, is similar. In addition to PC/1000 and III/4 disks, it comes with a null modem adapter.

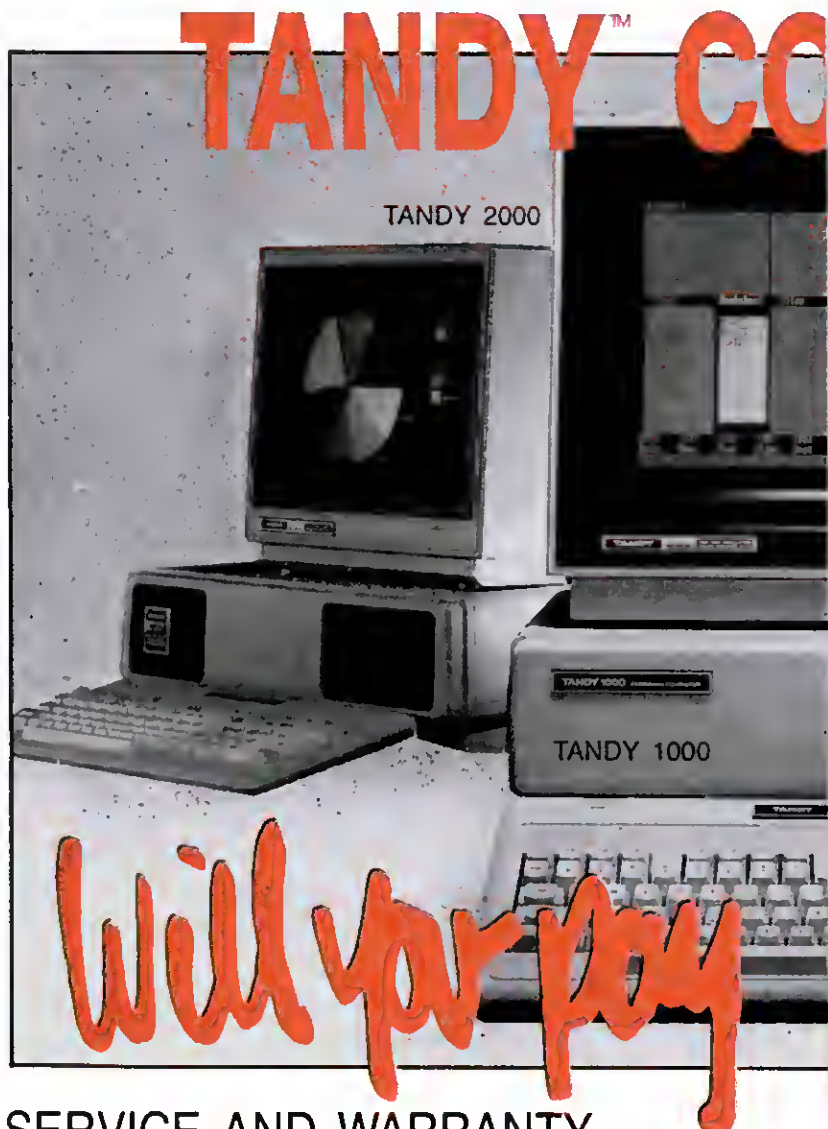
Example No. 1

I'll take you through one of the situations listed at the beginning of this article to demonstrate how direct transfer works.

One of your employees (we'll name him Fred) uses a Model 4, while another (Louise) has a brand-new Tandy 1000. Fred has a VisiCalc file that Louise wants to integrate into a report she's writing with WordStar. Their desks are right next to each other and they both have RS-232 ports, so direct transfer is feasible. How do they go about getting the VisiCalc file from Fred's TRSDOS disk to Louise's WordStar disk?

First, Fred should save the spreadsheet using VisiCalc's print file option with the PF command described in the VisiCalc manual. VisiCalc saves the print file in ASCII format for transferring it via an RS-232 cable or modem.

Next, Louise plugs the null modem adapter into the RS-232 port of her 1000. (Fred could put it on his Model 4, but his RS-232 port is on the bottom of the machine, so Louise's is easier to access. Newer 4's have the RS-232 more conve-



**SERVICE AND WARRANTY
NATIONWIDE**
THE ONLY DIFFERENCE IS THE PRICE

SAVE SALES TAX* PLUS DISCOUNT
(* TEXAS RESIDENTS ADD ONLY 4 1/8%)

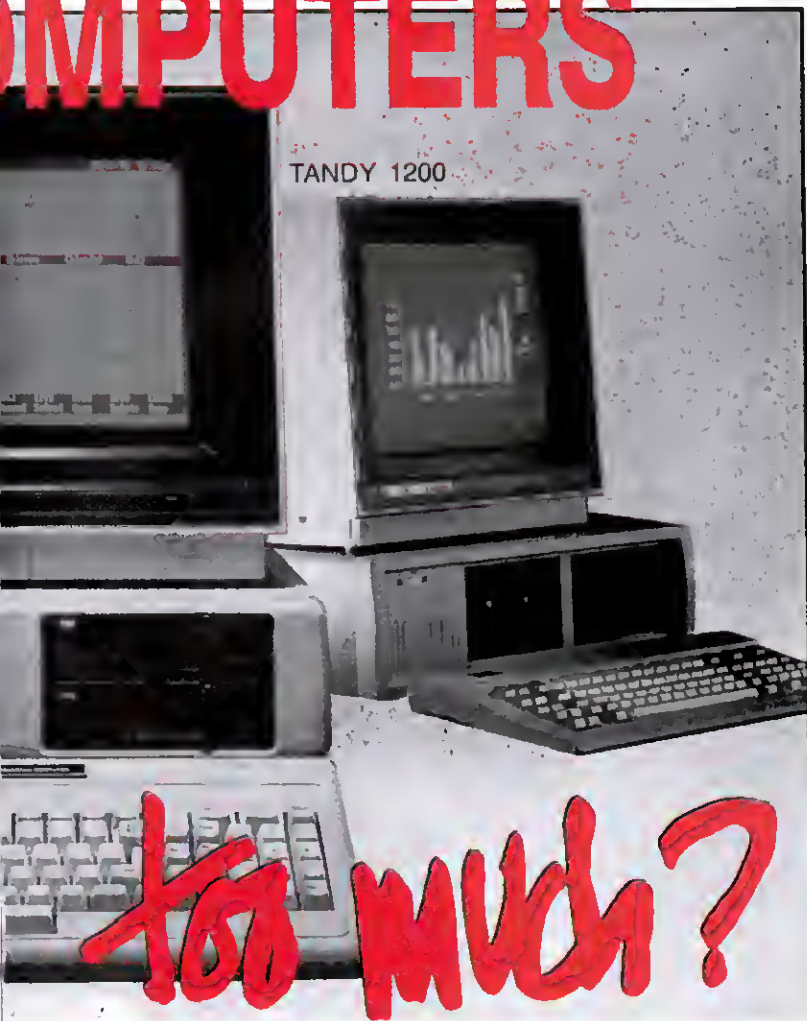
**CUSTOMER SERVICE/QUESTIONS ABOUT
YOUR ORDER and in TEXAS 1-817-573-4111**
(9 am-5 pm TEXAS TIME MONDAY-FRIDAY)

Fort Worth Computers
377 Plaza
Granbury, Texas 76048



CALLFREE NUMBER:

COMPUTERS



ASK ABOUT OUR
30 DAYS
BUY BACK POLICY



Circle 214 on Reader Service card.

FORT WORTH COMPUTERS

(WE ARE SERIOUS ABOUT SAVING YOU MONEY)

Located 30 miles from Ft. Worth

For
Latest
Prices

(1-800-) **433-S-A-V-E**

niently located at the back of the computer.) They then connect the two machines' ports with an RS-232 cable.

Radio Shack computers send asynchronous data through the RS-232 ports; that is, they permit gaps of varying length between the characters. The advantage of asynchronous transmission is that you don't have to send characters one right after another; you can send them as they're available, such as when you're pressing keys.

Fred and Louise load and run Good Software's Let's Talk on their machines. They configure their computers to transfer the Print file at 2,400 baud and instruct the software to prompt them before sending or receiving any files. The RS-232 port in Radio Shack computers can send and receive asynchronous data at rates as slow as 75 baud and as fast as 19,200 baud when you've got two computers directly connected. However, the maximum rate of data transfer using Let's Talk is 2,400 baud.

It doesn't matter to Let's Talk whether Fred sends the file to Louise or Louise receives it from Fred's 4, but for this example, we'll have Louise receive the file. Louise presses control-R on her Tandy 1000 to initiate the transfer. The software prompts her for the name of the file she wants to receive and for the name she wants to save it under on her Tandy 1000. Once she does this, the program transfers the file and writes it directly to Louise's MS-DOS disk.

When Let's Talk completes the transfer, it returns to its conversational mode and waits for instructions to transfer another file or to exit back to DOS. With the VisiCalc file safely transferred, Louise can go on with her job of merging the new file with her WordStar document. In all, including the time it takes to hook up the two machines, the process should take no more than a few minutes.

Remote File Transfer

Remote file transfer means sending data over the telephone lines from one computer to another. You'll need an extra piece of hardware for remote transfer, a modem. The modem converts the digital data pulses transmitted from the RS-232 port to tones the telephone line can handle. The receiving computer must also have a modem to convert the tones back to digital data.

I could easily get lost in a discussion of the different kinds of modems available. For our purposes, you need only know that the two basic types of modems are acoustic and direct-connect. A direct-connect modem can be either internal (as a card) or external.

An acoustic modem (also called an acoustic coupler) has a cradle for the telephone, while a direct-connect modem has a plug for your phone jack. Both connect to your computer via the RS-232 port, with one exception. An internal modem doesn't



need an RS-232, since it's attached directly to your computer's innards.

Modem hardware continues to evolve. Three-hundred baud has been the standard transmission rate, but 1,200-baud modems have improved significantly. Modems that transfer at 2,400 baud are becoming prominent as high-speed data transfer becomes more important. For microcomputer enthusiasts, 300- or 1,200-baud communications is the most common.

When you send data over phone lines, the computer receiving the call is known as the host. You must configure it to answer a call from the remote computer set up in the originate mode.

You can use remote transfer to send data directly from one computer to another, or you can use the host as a way station—that is, the host computer can hold data you want retrieved later by another remote computer.

For instance, *80 Micro*'s authors will sometimes upload files to CompuServe, and the editors will download the files at their convenience.

As is the case with direct data transfer, most remote data transfer requires that you put the information in ASCII format. However, you do have an alternative: Xmodem (sometimes called Christensen, after its author Ward Christensen). This protocol lets you send compressed Basic files, binary (/CMD) files, and ASCII files. It features a superior method of checking for errors during transmission. Xmodem is a public-domain program available on many electronic bulletin boards and as a feature of many terminal programs, such as Microlink II.

As with direct transfer, you need software. You have a little more flexibility here, since most terminal packages let you access most host computers.

If you own a Model III or use your 4 in III mode, you can pick from several programs still on the market. These include

SuperCross/XT-Plus

NOW SUPPORTS 170 FORMATS!

EASILY TRANSFER FILES FROM THE TRS-80™ TO MS-DOS™ OR CP/M™ AND BACK!

See the 4-STAR Review in this issue*!

80-MICRO summed it up: "The value of this program far exceeds its price...
If you work with different computers, it's a must."

*Newer, improved version has been shipping for months.

***Don't be confused by competitors that are really BASIC translators
with very limited transfer capabilities!**

***Don't be strapped to a program that only support PC-DOS 1.0!**

***Make sure you don't get a stripped-down version of HyperCross!**

***Copy your files direct to YOUR version of DOS!**

***SuperCross/XT and SuperCross/XT-Plus are the MOST powerful
disk format file-transfer utilities available for the TRS-80!**

SuperCROSS/XT will allow you to COPY files back and forth between different operating systems. Up to 170 of them - including PC/MS-DOS 1.x,2.x/3.x (single or double-sided), CP/M+, or CP/M 2.2 on your TRS-80™ Model 4/4P, III, or I/OO. You can do this with your existing hardware and SuperCROSS/XT, eliminating modems, cables, and terminal program transfers. SuperCROSS/XT runs as a /CMD file under your TRS-80 operating system. Data files, spreadsheet files, and text files can also be usefully moved between machines, like years of Visicalc™ files, business letters, legal drafts, or medical records, for example.

Comments and letters on-file from registered users are unusually enthusiastic about this product and its ease of use. *It WILL do what you think it will do, it's easy, and it WORKS GREAT!* New features in SuperCROSS/XT include "tagging" files for multiple COPY's or KILL's to eliminate many unnecessary keystrokes!

Some unsolicited customer comments from our registration cards...

"Powerful & easy to use" - GFP, Chicago IL

"A very handy product worth much more than the price." - KA, Port St. Lucie FL

"Superb product!" - JF, Calgary Canada

"Excellent product! Works as advertised." - GF, Boise ID

"Really works well." - RK, Monmouth OR

"Works! Rejoice! I can now talk to PC's!" - CN, Sanatoga PA

"I love SuperCross! I love PowerSoft!" - TAC, Gadsden AL

"Excellent. No problems at all." - RH, Santo Domingo Dominican Republic

"Super! It performs the task I needed done." - TT, Rockville MD

"Fantastic! I transferred my files within 1 hour!" - PJS, Rolla MO

"LOVE IT!" - Col. CDL, APO San Francisco CA

"Doc is straightforward & understandable. Solves my problem." - DG, C.Chase, MD

"Top Notch! Works for me." - DB, Lancaster PA

"Great product as usual." - CL, Laurel MD

"Will save 100's of hours! It'll protect my 4P from obsolescence"-RJ, Denver CO

"Outstanding!" - GA, Hawthorne CA

"Program works very well. I like it!" - MDM, Rochester, NY

"Superb. Easy to understand documentation." - RES, St. Louis, MO

CNVBASIC/CMD, available separately, "preps" your BASIC programs before sending over with SuperCROSS/XT. It will make most of the syntax and spacing changes required for converting Model I/III BASIC programs for use on MS-BASIC, CP/M BASIC, or Model 4 BASIC. Complex or commercial business packages written in BASIC probably will not convert 100% over by our or any other BASIC translator. So why put the bulk of your money into a translator when what you REALLY need is a great disk format FILE-TRANSFER utility?

*Some of the DOS Formats Supported: PC/MS-DOS variations include 1.x, 2.x/3.x single or double-sided (IBM and most compatibles), and Tandy 2000. CP/M variations include most well known single and double-sided formats including TCP/M 3.0+, Montezuma Micro 2.2 (all versions), Holmes and up to 180 others including: ALTOS, CROMEMCO, DEC, EAGLE, EPSON, HP 125, CP/M 86, KAYPRO, LNW-80, MAX-80, MORROW, NEC, OSBORNE, OTRONA, SANYO, SUPERBRAIN, TELETEK, TELEVIDEO, TRS-80 LIFEBOAT/L, OMIKRON/L, HOLMES/3, HURRICANE COMPACT/3, SHUFFLE BOARD/3, XEROX, ZENITH+HEATH, & 8" standard CP/M.

Important! Please specify Mod I/DD, III, 4/4P, or Max-80 computer type required.

SuperCross/XT (70 disk formats)*	\$ 99.95
CNVBASIC/CMD alone	\$ 29.95
BOTH! • COMBO Special!	\$119.95
SuperCross/XT-PLUS (170 disk formats)	\$129.95
BOTH! • SuperCross/XT PLUS Combo Special!	\$149.95
*Includes CNVBASIC/CMD	

*SuperCross/XT is also available from **Express-Order-Software** at all Radio Shack™ Computer Centers or any other Radio Shack™ store - as well as from us or any of our dealers.

• Order information on next page. Thank you. •

Super Utility

for PC/MS-DOS™

Full data file recovery, disk exploring, zapping, and MUCH more!

Fixed/Floppy Disk-Tools for IBM PC™, XT™, AT™
and many other PC compatibles including TANDY 1000, 1200, 2000

PC/MS-DOS users... your wait is over for a GREAT new disk utility! Accidental deletions and disk directory problems can happen to anyone at anytime... a power spike, fingerprint, speck of dust, hardware problem, or simply typing DEL "*" in the wrong sub-directory can destroy critical data in a moment without warning. Therefore we introduce **Super Utility** for the PC - an easy to use disk utility containing many functions sorely needed in today's PC/MS-DOS computing environment.

With **SU/PC** you can restore damaged or deleted files using two different methods (one easy, the other a little tougher). Even clusters of an erased file assigned to another file can still be restored, unless the user has physically written over every byte of the original data (especially useful in word processing files).

In addition to file repair and recovery, **Super Utility** provides sector verify, sector editing, modification of sectors in Hex or ASCII, ease of renaming of files and setting their attributes, string search, copying sectors to a file, diagnostic sector checking, mapping of the FAT table of a file or an entire drive, visual graphics pertaining to your system, and full directory and sub-directory editing without endless menu-hopping - all in one program. The sector display mode displays all 512 bytes on-screen at one time and allows you to fully explore your disks. SEARCH and CHANGE are nice here! Compatible with DOS versions 2.0 - 3.1 on most systems. Some computers may require the use of PC-DOS. Color, composite, or monochrome video are supported. A great tool for fixed disk users as well as floppy. Also compatible with IOMEGA's Bernoulli Box™ storage device (soon to be distributed by Tandy). Easily the most **POWERFUL** PC/MS-DOS disk utility available today. Please do not confuse the MS-DOS version of **Super Utility** with the TRS-80 version. **Super Utility for MS-DOS is NOT SU+ from the TRS-80™ "ported over"**. That is impossible. **SU/PC** is a totally new program that fills the gaps that PC users have most need of and have asked us for. It's aimed at the beginner, the "office user", hobbyists, students of the PC, or programmers alike.

So, why not be certain about the safety of your data (and your peace of mind) when you can have **Super Utility/PC** disk insurance right on hand at an unusually low price? Make your new computing life easier, more fun, and knowledgeable all at the same time.

Super Utility/PC is easy to use, unprotected, includes complete instructions, is educational, and great insurance against problems!

• **Introductory Offer •**
only \$89.95

POWERSOFT

17060 Dallas Parkway, Suite 114
Dallas, Tx 75248 • 214/733-4475

Prepaid or charge card orders (only) include free UPS shipping to US addresses! Blue label, COD, or over-night shipping available at extra charge. Visa/MasterCard accepted. Canada, please add \$3; airmail. Other countries add \$15 for airmail. Foreign orders, please use Charge Cards ONLY. Checks not drawn on U.S. banks are not accepted. Texas residents must add sales tax!

Our European customers might find it easier to contact our distributor in the UK: MOLIMEX LTD, 1 Buckhurst Road, Bexhill-On-Sea, East Sussex, England • (0424) 220391 / 223636

Requirements: IBM PC or compatible running PC/MS-DOS 2.x-3.x, minimum of 128K memory, and at least one disk drive. PC-DOS may be required for use.

IBM, PC, XT, and AT are registered trademarks of International Business Machines Corp. MS is a registered trademark of Microsoft.

Omniterm from Lindbergh Systems, Microterm from Micro-Systems Software, and Radio Shack's Videotex. Model 4 owners can choose, in addition to Model 4 versions of the above, Microlink II from B.T. Enterprises. Many public-domain BBSes also carry simple terminal programs, as do publications like *80 Micro* (see Related Articles at the end of this article).

Most terminal software is functionally the same; some packages allow more buffer space for transferring files, some let you perform DOS commands while on-line with a host computer, and some support transfer protocols other than ASCII. The best way to get the most out of a terminal package is to define exactly what you will be doing with it and then find the program that meets those needs.

Another Example

Time for another case study. John and his Model 4 live in Duluth, while Peter has a Model 2000 in Miami. Peter has a simple data encryption program written in Basic that he would like to send John. How do they go about transferring the program?

The software John has for his Model 4 is B.T. Enterprises' Microlink II, while Peter runs Radio Shack's Videotex Plus. Since Videotex Plus does not support Xmodem transfer, Peter will have to send it in ASCII. The first step for him is to save the encryption program in ASCII format using the SAVE "FILE NAME", A command.

John and Peter then load and run their terminal programs and set them to the same baud rates and word lengths. Either can act as the calling, or remote, computer while the other plays host, but for this example, let's set up Peter's as the host system.

As the remote system, John must set up his modem in the originate mode, while Peter's system must be in the answer mode. These two configurations work automatically in smart modems or you set them with dual in-line package (DIP) switches inside each modem.

John then calls Peter's computer. After they make the connection, they can converse via the keyboard while they're in terminal modes. To transfer the ASCII file, Peter first loads it into Videotex's capture buffer while John opens his buffer and waits for the file. When Peter loads the file, he sends the contents of the buffer over the phone, where it enters the buffer on John's machine.

John closes his capture buffer and saves it to a disk file, types in "Goodbye," and exits the terminal program. With the ASCII file now on his disk, John can look at it with a word processor to delete any miscellaneous characters caused by static on the phone line, and save the clean file.

In Basic, John can load and run the ASCII file. Basic will convert the ASCII to compressed Basic and run it as usual, but to save time in the future you should save the file again in its compressed format. This



way, Basic won't have to convert the ASCII file every time John runs the program.

Software Solutions

Some companies have taken a software approach to file transfer: Their products let your computer read data from an alien disk (one written by another computer) and move that data to its own disks or write a file to disk that a different computer can read. Powersoft's Supercross/XT and Tandy's PC Maker are two such products.

Supercross/XT is Powersoft's version of Hypersoft's Hypercross. It lets you transfer files to and from disks in a variety of formats, including MS-DOS, CP/M, and the various I/III/4 DOSes (see Table 4 for a complete list of I/III/4 formats). It also lets you format a disk that another computer can read. For example, with Supercross/XT in drive zero of your Model 4, you can format an MS-DOS disk in drive 1, transfer TRSDOS 6.X.X files to the MS-DOS disk, and then read the MS-DOS disk on a PC or PC-compatible.

PC Maker is Tandy's attempt to make the Tandy 2000 more IBM PC-compatible by providing an intermediate disk format that lets the 2000 write files that both machines can read. Normally, the Tandy 2000 can read files from PC disks, but since the 2000 uses 80-track, quad-density disks, any files you write to a PC disk that you might want to read with the 40-track, double-density PC drives won't load. As a band-aid approach to the 2000's incompatibility problem with the PC, PC Maker is only a partial solution.

Example No. 3

Here's an example of how you use Supercross/XT to solve our remaining problem. Diane uses Scripsit on her trusty Model III at home to write reports that she distributes on her company's e-mail system, which runs on a Tandy 1200HD. Nei-

TANDY[®] COMPUTERS

WITH THE
MANUFACTURERS
WARRANTY

ALWAYS AT "S



- ☒ DISK DRIVES
- ☒ PRINTERS
- ☒ MODEMS
- ☒ SOFTWARE
- ☒ ALL RADIO SHACK PRODUCTS
- ☒ CHECK OUR SALE PRICES -- CALL -----

DFW/COMPUTER CENTER

SALE" PRICES



MODEL 4



30 DAY
BUY BACK
POLICY
(Call for details)

CUSTOMER SERVICE
(817) 481-SALE
(9 a.m.-5 p.m. C.S.T.)

TOLL FREE 1-800-433-SALE

326 Main St. Grapevine, Texas 76051

TEXAS BUYERS ADD 5%% SALES TAX.

ther her Model III nor the Tandy 1200 can read the other's disks, so she uses Supercross to write the file on an MS-DOS disk.

First she boots her Scripsit disk with the report and Supercross on it in drive zero and puts the MS-DOS disk in drive 1. She runs SX3/CMD (the Supercross program) and configures it for the Model III format her system disk uses.

On the first page of the list of disk formats Supercross supports, she finds choice 1D, which is the MS-DOS 2.0 double-sided, double-density format used by the Tandy 1200. She enters 1D and the screen changes to another menu from which she can pick what she wants to do with the alien disk. Pressing the T key transfers a file from a TRS-80 disk to an alien disk.

After Diane presses the T key, the program asks which file she wants to transfer. She enters the file name. Then Supercross asks if she wants an ASCII or Image transfer. Image transfers are sometimes a little quicker than ASCII transfers because they copy data sector by sector. For this exercise, though, Diane chooses the ASCII transfer.

Supercross then reads the file from the TRS-80 disk and writes it directly to the MS-DOS disk. It takes no more time than TRSDOS 1.3's Copy command. Once she has transferred the file, she goes to work, puts the MS-DOS disk in the 1200, and submits it to the e-mail system. The whole process takes very little time and is the most direct method of moving information from one computer to another without using the RS-232 port.

Now What?

So you've finally figured out how to move files between machines quickly and easily. Now you face two additional barriers: how to convert programs written with other Basics so they'll run properly, and how to massage data files so the program you want to process them can do so. We'll tackle these problems next month. ■

Bradford N. Dixon is a technical editor on the 80 Micro staff.

Related Articles

Balonis, Ronald, "Pin Pals," February 1984, p. 194. Make a null modem cable.

Fischer, David M., "Smart Talk," May 1984, p. 50. Debugs: October 1984, p. 32; February 1985, p. 33. DynaTerm, a smart terminal program for the Models I and III.

McGarvey, Richard C., "Basic Communication," June/July 1982, p. 324. Basic terminal program for the Model I.

Means, Jack, "Crossdos," October 1981, p. 288. Utility to copy Model I TRSDOS files to CP/M.

Payne, Douglas, "Talk to the Big Guys," September 1983, p. 230. Debug: December 1983, p. 20. Using the Model III as a dumb terminal to access mainframes.



My 10 Favorite Assembly-Language Subroutines

by Hardin Brothers

Add zip to your Basic programs with these utilitarian machine-language routines.

Most computer programs perform three tasks: get data, manipulate that data, and then put the data somewhere. Basic, though sometimes slow, has enough power to do most tasks and, with its Print Using command, it's better at displaying information than many other languages.

However, Basic's input and screen-handling commands often leave much to be desired, especially if you're writing large application programs. Some functions that would be useful in simplifying data input for a user are either difficult or impossible to write in Basic.

To simplify my own programming, I've written a number of machine-language subroutines that I merge into my Basic programs. You'll find 10 of them for the Model 4 in Program Listing 1, along with a demonstration of how the routines work. Program Listing 2 shows the same routines for the Model III. The only differences in the demonstration portion of the listings are due to the differences in the Models III and 4 Basics and their screen sizes.

I've adopted several conventions that make these routines easy to use. The initialization routines, which run once at the beginning of a program, always start at line 61000; I call the subroutines with GOSUBs to lines between 60000 and 60999; and I reserve all variables beginning with the letter Q for these routines.

The final convention is perhaps the most important. Since Basic does not use local variables except in user-defined functions, you must avoid variable conflicts in a program. The 40-character variables Model 4 Basic allows help avoid conflicts, but I've found that reserving a whole class of variables names for library subroutines speeds up my programming substantially. I can merge these routines into a program without worrying about accidentally altering variables that are important in other parts of the program.

The Routines

Basic's Input and Line Input commands exhibit a major weakness: You can't control the number of characters you're allowed to type in, even though programs often must define maximum lengths for various data fields.

My first routine overcomes this problem by displaying an input field and restricting input to a given number of characters. Before you call the routine, you must print any necessary prompts on the screen and posi-

tion the cursor to the start of the input area. Your program then loads the maximum size of the input field into the variable Q% and calls the routine at line 60100. The program automatically displays the input field and accepts all normal keyboard input, as long as you don't try to type beyond the end of the field. When you press the enter key, the input goes back to the program in the variable Q\$.

You'll find the next two subroutines useful for standardizing input in a form that a program can easily handle. The routine at 60200 strips any trailing blanks from a string so you can work with its true length. And the routine at 60300 converts a string's lowercase characters to uppercase. Though you could write these subroutines entirely in Basic, they would require more programming space and more execution time.

I wrote the fourth and fifth routines to give Model 4 Basic two Model III functions. The fourth protects up to seven lines at the top of the screen from scrolling. In Model III Basic, you can protect the top of the screen with a simple POKE; because the Model 4 has no set addresses, you must use a short machine-language routine that communicates with the operating system via a supervisory call.

The fifth routine sets, resets, or tests the current state of the Caps Lock key. In the Model III, an entire byte holds the state of that key; the Model 4 uses a single bit of one of the flag bytes to show whether the machine will translate lowercase input to uppercase. You must use a supervisory call in machine language to find that byte.

The next four routines give you complete control over data entry. Routine 6 is a simple full-screen editor that lets you move the cursor around the screen at will and type in anything anywhere.

Before you call the full-screen editor, you can print any messages and prompts you want and set the cursor anywhere on the screen. Then you pass control of the screen to the keyboard by calling the subroutine. While the editor is running, most keys operate normally. If, however, you press the shift and arrow keys, you can move the cursor without erasing. To move down on the Model III, you have to press the shift/down-arrow/Z keys. To leave the editor and return to Basic, press the clear key on the Model III or the shift and clear keys on the Model 4.

The full-screen input editor will not let you scroll off the bottom of the screen with

the shift and down-arrow keys but it will let you type off the bottom. The machine-language routine would have to be much longer to prevent that from happening. However, I've found that this routine works well for everyone except those intent on trying to bomb programs.

Once a program gets some data, it must have some way to copy that information into a string to process it. The seventh subroutine does just that. The Model III version is fast; it operates by pointing a string at a line of the screen and then copying everything in that line to a new string.

The Model 4 video display is not normally in addressable memory. Therefore, the Model 4 Line Copy routine uses one of the supervisory calls and copies the screen row to a string 1 byte at a time. Though noticeably slower than the Model III routine, the Model 4 version can still copy the entire screen to 24 strings in slightly over a second, which should be fast enough for most applications.

Sometimes you'll want to copy a single line from the screen to a string. At other times, you might need to copy the entire screen to an array of strings. Routines 8 and 9, written entirely in Basic, use the Screen Copy utility to copy the entire screen. Your program can capture everything you type on the screen and then manipulate that information as necessary. The final routine, which appears only in Program Listings 2 and 4, takes advantage of the Model 4 in the Model III mode. If you try to use it on a standard Model III, nothing happens. If you try it on a 4 in 4 mode, you'll be faced with certain catastrophe.

The Model 4 has 2K bytes of video memory. However, it uses only half that for the Model III mode's 16-column by 64-character display. The other half generally sits unused. This routine lets you switch between two video pages.

When you do so, the cursor moves to the second page, although its position is the same. When you switch a screen out of view, its information hides from the rest of the system until you call it back.

I've used this second page to display a



System Requirements

**Models III and 4
Disk Basic**

PRINTER SALE

THE STATE OF THE ART

The C.I.TOH 3500 is fully IBM/Tandy 1000-1200-2000 compatible and FAST. Using bidirectional, logic-seeking printing across a full width of 13.2 inches, this little beauty prints at a speed of 350 characters per second (CPS). Letter quality printing is available at a rapid 87 CPS—more than twice the speed of most daisywheel printers. Couple that with a quick linefeed of 30 milliseconds per line and a standard buffer of 2K (16K optional, \$50) and you have just about the fastest throughput around. Only 4.7" high and a low noise level of 58 dBA.

Maximum versatility is offered for data and wordprocessing output, spreadsheets and business graphics by a variability of print densities, speeds, character sets and fonts, spacing, forms control and other attributes realized by operator and computer alterable functions, allowing the printer to be tailored to almost any application.

We could rave on and on about this fantastic printer but the proof is using this printer in your application. Try it on our 14 day money-back-if-not-satisfied plan. Don't be printer bound any longer. Call today.



350 CPS only \$1995
(Please Specify Serial or Parallel)
(Shipping Included)

C.I.TOH
DIGITAL PRODUCTS

**Low Profile Design
ONE YEAR WARRANTY**



\$229 (Add \$10 S & H)
List \$299

StarWriter™ Y-10, F-10 40/55. Daisy wheels with speeds ranging from 22 to 58 CPS for the sharpest in letter quality printing. 13.5 and 15-inch carriage widths. Switch-selectable pitches 10, 12, and 15. Compatible with all popular word processing software.

F10-40 15" wide 40cps Diablo/Qume printwheels \$899
F10-5S Fastest DW printer at 58cps 15" wide \$999
F10 Bi-Directional Tractor \$199
F10 Mechanical sheet feeder \$299



As Low As \$899
(Add \$15 S & H)



As Low As \$299
(Add \$12 S & H)

ProWriter™ 8510S/1550S+ NLQ Series Dot Matrix Printers. Near letter quality, 180/120 CPS with throughput speeds of up to 110 LPM for far faster text and graphics than competitors. Models specifically designed to provide the finest performance and flexibility with IBM® and Apple®/Macintosh® microcomputers.

8510 BPI IBM Graphics, 120cps 10" friction/tractor \$299
8510 SEP IBM Graphics, NLQ and faster at 180cps \$399
8510 CEP IBM Graphics, 180cps plus 7 colors \$499
1550 EP 15" wide 120cps friction/tractor included \$499
1550 BCD Like above but RS232 interface... **SPECIAL** \$299
1550 SEP 15" IBM Graphics NLO and a fast 180cps \$599

ProWriter™ 24LQ. The Ultimate Printer. 24-pin dot matrix printer. 8 printers in 1 for all professional printing needs. 200 CPS for data, 133 CPS memo quality, 67 CPS letter quality. Selectable type styles. Up to 7-color graphics at 360 x 360 DPI.



\$999 (Add \$15 S & H)
List \$1299

ORDER TODAY CALL TOLL FREE 800-527-0347/800-442-1310



**MONTEZUMA
MICRO**

P.O. Box 32027
Redbird Airport, Hangar #8
Dallas, TX 75232
214-339-5104

help screen of a previous version of data that has been edited.

The Listings

I wrote the programs in Listings 1 and 2 in a style I often use. Even though each Basic line has several commands, no program line has more than one, and all loops have consistent indenting. Programs like these are easier to debug than those with several commands squeezed together. However, once you've debugged a program, you might want to remove extra spaces.

You might wonder why the Model 4 subroutines never use element zero of any array. I often use the Option Base command in Model 4 Basic programs to make arrays begin at 1 instead of zero. By completely ignoring the zero element of each array, these subroutines are compatible with all Basic programs whether they use Option Base or not.

Program Listings 3 and 4 provide the Assembly-language source code for the subroutines. Although the Model III and 4 Basic listings look almost identical, the real work done at the machine-language level is quite different.

By studying the differences between the Models III and 4 versions of the source code, you can learn a great deal about the peculiarities of each machine. Notice, in particular, that the Model 4 version has no

Call instructions to outside routines. Since the Model 4 is completely RAM-based, I can't guarantee that routines will be in a specific location in different versions of TRSDOS. However, Logical Systems has guaranteed that the supervisory calls will stay the same in all versions of TRSDOS 6.X, so most programs interact with the DOS only through the SVCs.

You can link a machine-language subroutine to Basic in many ways. The method I've used here—loading each routine into an integer array—is one of the most flexible and easiest to use once you've converted each routine to its integer equivalents. You can make that conversion by hand, of course, but it's easier to let the computer do it for you if you follow these steps.

First, write and assemble your routine with an origin near the top of memory. From DOS, clear memory, then protect high memory and load the assembled routine. Enter Basic and invoke your routine with an appropriate USR or Call instruction to debug it. Once you're sure you've thoroughly debugged the program, you can convert it to integer form.

You must know the beginning and ending addresses of the routine in high memory. Run Program Listing 5, and the integer equivalents of your program will appear on your screen or printer. If you cleared memory before you started, you

can ignore any trailing zeros in your list of integers. Finally, write a short installation routine in your Basic program that will read those integers into an array, and you're all set.

If you keep disk files of routine libraries, write these so that their line numbers don't conflict. You'll soon be able to write programs as a simple series of calls to bug-free routines. ■

Write to Hardin Brothers at 280 N. Campus Ave., Upland, CA 91786, or contact him on CompuServe's WESIG.

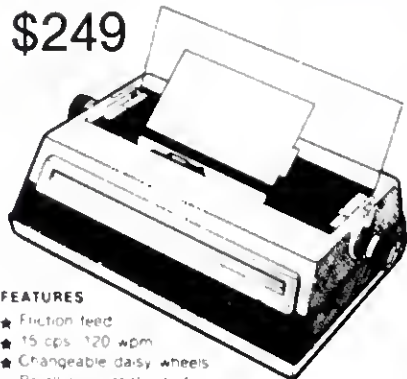


Circle 456 on Reader Service card

DAISY WHEEL New Smith Corona L-1000

True letter quality printer for less than the cost of an office typewriter! Priced \$500 less than other popular daisy wheel printers!

SALE PRICE:
\$249



FEATURES

- ★ Friction feed
- ★ 15 cps, 120 wpm
- ★ Changeable daisy wheels
- ★ Parallel or serial interface
- ★ Compatible with R/S Apple, etc.



SUNLOCK SYSTEMS
210 Conner Rd.
Mechanicsville, VA 23111
(804)-746-1600

ADDITIONAL PRINTER SPECIALS

Epson	Okidata	ComrexCR11	\$359	Citoh 7500	\$239
Rx80	\$229	ML92	\$369	Comrex III	\$99
LX80	249	ML192	369	Star 5G10	239
RX100	399	ML84	649	Star PwrTp.	329
FX80+	369	Ok120	149	Str. Radix10	519
FX100+499	ML93	\$79	Gemini 15x	349	Sv. Reed 500
JX 80	499	ML182	239	Delta 10	359
				Epson 1500	899

TO ORDER CALL TOLL FREE 800-368-9191
In Virginia call 804-321-9191

We accept MasterCard, Visa and CODs

T/Maker

Integrated Software

Word Processing
Spread Sheet Analysis
Relational Data Base Management
Spelling Checker
Bar Chart Graphics
Data Encryption

Available for:

IBM PC, Tandy 1000, 1200, 2000
Requires 128k, Retail \$450

Kaypro, Epson, Montezuma CP/M
Requires 64k, Retail \$450

NEW! Model 4-1P (TRSDOS 6.2)
Requires 64k, Retail \$299

T/Maker Company
2115 Landings Drive
Mountain View, CA 94043
415/962-0195

Circle 266 on Reader Service card.

InfoWorld quote from "Review Responses," Vol. 51 © 1985, InfoWorld
Reprinted by permission. All rights reserved. © 1985, T/Maker Company

Now Available at
MODEL 4/4P (64k)
and
TANDY 1000 (128k)

Infoworld Report Card

T/Maker

"T/Maker is excellent."

—Don Enbhi 12/17/84

	Poor	Fair	Good	Excellent
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Program Listing 1. Model 4 subroutines and demonstration program.

```

10 ' Model 4 Subroutines
20 GOSUB 61000 'Initialize
30 CLS: PRINT "MENU of Demos": PRINT
40 PRINT " 1. Formatted input"
50 PRINT " 2. Strip blanks"
60 PRINT " 3. Convert to upper case"
70 PRINT " 4. Caps-lock utility"
80 PRINT " 5. Scroll protect"
90 PRINT " 6. Pull screen input"
100 PRINT " 7. Capture screen-row in string"
110 PRINT " 8. Full screen capture (1)"
120 PRINT " 9. Full screen capture (2)"
130 PRINT " 0. End Demo"
140 PRINT: PRINT "choice==> ";
150 AS=INPUT$(1): A = VAL(AS): IF A<0 OR A>9 THEN
GOTO 150 ELSE IF A = 0 THEN CLS: END
160 ON A GOSUB 180,220,260,290,360,410,470,520,570:
GOTO 30
170 '
180 CLS: PRINT "Formatted input "; INPUT "How many
characters to input (1 - 254)";Q%
190 IF Q%<1 OR Q%>254 THEN GOTO 180 ELSE PRINT
"Input your string==> ";:GOSUB 60100
200 PRINT: PRINT "Your string ==> ";Q$: AS=INPUT$(1):
RETURN
210 '
220 CLS: PRINT "Strip strings": INPUT "Length of text"
;A: INPUT "Number of blanks";B%
230 Q$ = STRING$(A," ") + STRING$(B%," "); PRINT Q$;
" length=";LEN(Q$): GOSUB 60200
240 PRINT Q$; "length="; LEN(Q$): AS=INPUT$(1):RETURN
250 '
260 CLS: PRINT "Convert case": PRINT "type in string
==> ";:LINE INPUT Q$
270 PRINT Q$: GOSUB 60300: PRINT Q$: AS=INPUT$(1):
RETURN
280 '
290 CLS: PRINT "Caps lock utility"
300 Q% = 0: GOSUB 60400: PRINT "Caps lock is now off
(type something) ";: LINE INPUT Q$
310 Q% = 1: GOSUB 60400: PRINT "Caps lock is now on
(type something) ";: LINE INPUT Q$
320 PRINT: PRINT "Set caps lock however you wish and
type something ";: LINE INPUT Q$
330 Q% = 2: GOSUB 60400: IF Q% THEN PRINT "Caps lock
on" ELSE PRINT "Caps lock off"
340 AS = INPUT$(1): RETURN
350 '
360 CLS: PRINT "Scroll Protect"
370 FOR I% = 1 TO 5: INPUT " # of lines to protect";Q%
:GOSUB 60500
380 CLS: FOR J% = 1 TO 30: PRINT J%: NEXT J%: FOR J%
= 1 TO 30: PRINT: NEXT J%: NEXT I%
390 AS=INPUT$(1): Q%=0: GOSUB 60500: CLS: PRINT "Done
with scroll protect": AS=INPUT$(1): RETURN
400 '
410 CLS: PRINT "Full Screen Input"
420 PRINT "<Shift> + arrows will move the cursor,
<Shift><Clear> to end"
430 GOSUB 60600
440 PRINT @ (23,33), "Done with that";
450 AS=INPUT$(1): RETURN
460 '
470 CLS: PRINT "Capture screen row in a string -- fill
screen with whatever you wish"
480 PRINT "Press <Shift><Clear> to end": GOSUB 60600
490 FOR I%=2 TO 23: PRINT @ (I%,0),I%," ";: NEXT I%:
PRINT @ (0,0),STRING$(79," ");: PRINT @ (0,2),
"Which row to capture?";: LINE INPUT AS:A=VAL(AS)
500 IF A < 2 OR A > 23 THEN GOTO 490 ELSE Q% = A:
GOSUB 60700: CLS: PRINT Q$: AS=INPUT$(1): RETURN
510 '
520 CLS: PRINT "Full screen capture #1 -- each line
saved in an 80-character string"
530 PRINT "Type whatever you want then press
<Shift><Clear>":GOSUB 60600
540 GOSUB 60800: CLS: PRINT "Press a key to see the
captured screen";: AS=INPUT$(1)
550 Q$(24)=LEFT$(Q$(24),79): CLS: FOR I%=1 TO 24:
PRINT Q$(I%);: NEXT I%: AS = INPUT$(1): RETURN
560 '
570 CLS: PRINT "Full screen capture #2 -- trailing
spaces stripped from lines"
580 PRINT "Type whatever you want then press
<Shift><Clear>": GOSUB 60600
590 GOSUB 60900: CLS: PRINT "Press a key to see the
captured screen";: AS=INPUT$(1)
600 CLS: FOR I% = 1 TO 23: PRINT Q$(I%): NEXT I%:
PRINT Q$(24);: AS = INPUT$(1): RETURN
610 '
60000 ' Model 4 Version -- Data handling subroutines
Be sure to initialize routines with GOSUB 61000
before use
60090 ' Formatted input -- shows input field with
',' characters and restricts number of
characters user can enter. Calling sequence:
Q% = number of characters allowed (1 - 254)
GOSUB 60100

```

```

60099 ' Input string returned in Q$
60100 IF Q%<1 OR Q%>254 THEN RETURN ELSE Q$=STRING$
(Q%+1,32): Q%=VARPTR(Q$): Q1%=VARPTR(Q1%(1)):
CALL Q1% (Q%): RETURN
60101 '
60199 ' Strip blanks from end of a string
Calling sequence: Q$ = string to strip
GOSUB 60200 String returned in Q$
60200 DEF USR9 = VARPTR(Q2%(1)): Q$=USR9(Q$): RETURN
60201 '
60299 ' Convert lowercase characters in a string to
uppercase Calling sequence: Q$ = string to
convert GOSUB 60300 String returned in Q$
60300 DEF USR9 = VARPTR(Q3%(1)): Q$=USR9(Q$): RETURN
60301 '
60397 ' CAPS-Lock utility: turn CAPS on or off, or
test present condition Calling sequence: Q% =
function request (0 = turn CAPS off 1 = turn
CAPS on
60398 ' 2 = test present state) GOSUB 60400
If test function is chosen then Q% returns
present state of CAPS:
60399 ' if CAPS are on, Q% = -1 (true)
if CAPS are off, Q% = 0 (false)
60400 Q1% = VARPTR(Q4%(1)): CALL Q1% (Q%): RETURN
60401 '
60499 ' Scroll protect -- protects 0 - 7 lines at
top of screen from scrolling (but not from CLS)
Calling sequence: Q% = number of lines to
protect GOSUB 60500
60500 DEF USR9 = VARPTR(Q5%(1)): Q%=USR9(Q%): RETURN
60501 '
60599 'Full screen input --- user can freely move
around screen and enter input anywhere
<Shift> + arrow moves cursor non-destructively
Calling sequence: GOSUB 60600
60600 DEF USR9 = VARPTR(Q6%(1)): Q%=USR9(0): RETURN
60601 '
60699 ' Copy screen row to a string
Calling sequence: Q% = row of screen to copy
(0 - 23) GOSUB 60700 String returned in Q$
60700 Q$=STRING$(80,32): Q1%=VARPTR(Q$): Q2%=VARPTR
(Q7%(1)): CALL Q2%(Q1%,Q%): RETURN
60701 '
60799 ' Pull screen capture -- Capture all screen
characters in array Each string returned is 80
characters long. Calling sequence: GOSUB 60800
Screen returned in Q$(1) through Q$(24)
60800 FOR Q%=0 TO 23:GOSUB 60700:Q$(Q%+1)=Q$:NEXT Q%:
RETURN
60801 '
60899 ' Full screen capture as above -- each string
in Q$( ) array is stripped of trailing blanks
Calling sequence: GOSUB 60900 Screen returned
in Q$(1) through Q$(24)
60900 FOR Q%=0 TO 23: GOSUB 60700: GOSUB 60200:
Q$(Q%+1)=Q$: NEXT Q%: RETURN
60901 '
61000 ' Initialization for Model 4 subroutines
GOSUB 61000 once at beginning of program
61100 ' Routine 1 -- Formatted input
61101 DATA 9006, 20510, 10149, 32291, 26147, 1391,
-14907, 11790, 574, 4335, -15077, 6150, 574,
4335, -15077, 2366, 14575, 8197, 30723, 536,
62, 30689, 201
61102 DIM Q1%(23): RESTORE 61101: FOR Q%=1 TO 23:
READ Q1%(Q%): NEXT Q%
61103 '
61200 ' Routine 2 -- Strip blanks from string
61201 DATA -5163, 9030, 9006, 20510, 6, 11017, -306,
0224, 11012, 8205, -7609, -13967
61202 DIM Q2%(12): FOR Q%=1 TO 12: READ Q2%(Q%):
NEXT Q%
61203 '
61300 ' Routine 3 -- Convert to upper case
61301 DATA 10155, 32291, 26147, 32367, 25006, 1040,
31742, 016, 24550, 9079, -3024, 201
61302 DIM Q3%(12): FOR Q%=1 TO 12: READ Q3%(Q%):
NEXT Q%
61303 '
61400 ' Routine 4 -- Caps lock utility
61401 DATA 25910, 32495, 470, 32509, 14346, 10253,
-13553, 15903, 10240, 15617, 9079, -13961,
-20533, 536, -4149, 39717, -14070
61402 DIM Q4%(17): FOR Q%=1 TO 17: READ Q4%(Q%):
NEXT Q%
61403 '
61500 ' Routine 5 -- Scroll protect
61501 DATA 1614, 15079, -4337, 201
61502 DIM Q5%(4): FOR Q%=1 TO 4: READ Q5%(Q%):NEXT Q%
61503 '
61600 ' Routine 6 -- Full Screen input
61601 DATA 310, 0431, -261, -14305, 6910, 3104, 1631,
15876, -4337, -300, 31511, -6104, 15951, -4350,
-7656
61602 DIM Q6%(15): FOR Q%=1 TO 15: READ Q6%(Q%):
NEXT Q%
61603 '
61700 ' Routine 7 -- Screen to string utility
61701 DATA 9006, 20510, 9030, 9006, 20510, 26347, 46,
-10011, 262, 3902, -11793, 4002, -16004, -3560,
201
61702 DIM Q7%(15): FOR Q%=1 TO 15: READ Q7%(Q%):

```

Listing 1 continued

```

NEXT Q%
61703 '
61800 ' Create space for necessary variables:
61801 Q1%=0: Q2%=0: DIM Q$(24): RETURN

```

End

Program Listing 2. Model III subroutines and demonstration program.

```

10 ' Model 3 Subroutines
20 '
30 CLEAR 2000
40 GOSUB 61000 'Initialize
50 CLS: PRINT "MENU of Demos": PRINT
60 PRINT " 1. Formatted input"
70 PRINT " 2. Strip blanks"
80 PRINT " 3. Convert to uppercase"
90 PRINT " 4. Caps-lock utility"
100 PRINT " 5. Scroll protect"
110 PRINT " 6. Full screen input"
120 PRINT " 7. Capture screen row"
130 PRINT " 8. Full screen capture (1)"
140 PRINT " 9. Full screen capture (2)"
150 PRINT " 0. Screen swap"
160 PRINT " X. End Demo"
170 PRINT: PRINT "choice=> ";
180 GOSUB 200: IF INSTR("Xx",A$) THEN CLS: END ELSE A
  =VAL(A$): IF A=0 AND A$<>"0" THEN GOTO 180
190 ON A+1 GOSUB 660, 220, 260, 300, 330, 400, 450,
  510, 560, 610: GOTO 50
200 A$=INKEY$: IF A$="" THEN 200 ELSE RETURN
210 '
220 CLS: PRINT "Formatted input ": INPUT "How many
  characters to input (1 - 254) "; Q%
230 IF Q%<1 OR Q%>254 THEN GOTO 220 ELSE PRINT "Input
  your string => ";: GOSUB 60100
240 PRINT: PRINT "Your string => "; Q$: GOSUB 200:
  RETURN
250 '
260 CLS: PRINT "Strip strings": INPUT "Length of
  text"; A$: INPUT "Number of blanks"; B%
270 Q$ = STRING$(A$, " ") + STRING$(B$, " "); PRINT
  Q$: "Length="; LEN(Q$): GOSUB 60200
280 PRINT Q$: "Length="; LEN(Q$): GOSUB 200: RETURN
290 '
300 CLS: PRINT "Convert case": PRINT "type in string
  => ";: LINE INPUT Q$
310 PRINT Q$: GOSUB 60300: PRINT Q$: GOSUB 200:
  RETURN
320 '
330 CLS: PRINT "Caps lock utility"
340 Q% = 0: GOSUB 60400: PRINT "Caps lock is now off
  (type some thing) ";: LINE INPUT Q$
350 Q% = 1: GOSUB 60400: PRINT "Caps lock is now on
  (type some thing) ";: LINE INPUT Q$
360 PRINT: PRINT "Set caps lock however you wish
  and type some thing ";: LINE INPUT Q$
370 Q% = 2: GOSUB 60400: IF Q% THEN PRINT "Caps lock
  on" ELSE PRINT "Caps lock off"
380 GOSUB 200: RETURN
390 '
400 CLS: PRINT "Scroll Protect"
410 FOR I% = 1 TO 5: INPUT " # of lines to
  protect"; Q%: CLS: GOSUB 60500
420 FOR J% = 1 TO 30: PRINT J%; NEXT J%: FOR J% = 1
  TO 30: PRINT: NEXT J%: NEXT I%
430 GOSUB 200: Q% = 0: GOSUB 60500: CLS: PRINT "Done
  with scroll protect": GOSUB 200: RETURN
440 '
450 CLS: PRINT "Full Screen Input. <Shift> + Arrow
  moves the cursor"
460 PRINT "<Shift><Down Arrow><2> moves down <Clear>
  to end"
470 GOSUB 60600
480 PRINT @ (985), "Done with that";
490 GOSUB 200: RETURN
500 '
510 CLS: PRINT "Capture screen row -- fill screen with
  whatever you wish"
520 PRINT "Press <Clear> to end": GOSUB 60600
530 FOR I% = 2 TO 15: PRINT @ (I%*64), I%: NEXT I%:
  PRINT @ (0), STRING$(63, " "); PRINT @ (2), "Which
  row to capture?";: LINE INPUT A$: A = VAL(A$)
540 IF A < 2 OR A > 23 THEN GOTO 420 ELSE Q% = A:
  GOSUB 60700: CLS: PRINT Q$: GOSUB 200: RETURN
550 '
560 CLS: PRINT "Full screen capture #1 -- saved in
  64-character strings"
570 PRINT "Type whatever you want then press
  <Clear>";: GOSUB 60800
580 GOSUB 60800: CLS: PRINT "Press a key to see the
  captured screen";: GOSUB 200
590 Q$(15) = LEFT$(Q$(15), 63): CLS: FOR I% = 0 TO 15:
  PRINT Q$(I%);: NEXT I%: GOSUB 200: RETURN
600 '
610 CLS: PRINT "Full screen capture #2 -- trailing
  spaces stripped from lines"
620 PRINT "Type whatever you want then press
  <Clear>";: GOSUB 60800

```

Listing 2 continued

Mail-Order
ElectronicsJameco
ELECTRONICSWorldwide
Since 1974

NEW!

Attention TRS-80 Model 100 Owners!

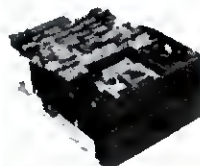
Pack a Purple in your Portable!



E-X-P-A-N-D Your Model 100

Easy to install module plugs right into the socket increasing memory in 8K increments. Complete with module and documentation for conversion.

M1008K (TRS-80 Model 100 Expansion)..... \$39.95



MPI 5 1/4" Disk Drive TRS-80 Owners!

• Use as a second disk drive • Single-sided
• Single/double density • Full height drive
• 48 TPI • Documentation incl. • Wt. 3.7 lbs

\$89.95 ea.

Part No. MPI51S..... or 2 for \$159.95

Enclose your second disk drive with JMR 5 1/4" disk drive enclosures.

• Houses one full ht. 5 1/4" disk drive • Unit complete w/power supply switch,
power cord, fuseholder & connectors • Size 5 1/2" W x 3 1/4" H x 1 1/4" D • 5.2 lbs

DDE-1FH..... \$69.95

TRS-80 Model I, III & Color Conversion Kit

TRS-80 to 16K, 32K, or 48K

**Model 1 From 4K-16K Requires (1) One Kit
Model 3 From 4K-48K Requires (3) Three Kits
Color From 4K-16K Requires (1) Kit

**Model 1 equipped with Expansion Board up to 48K Two Kits Required
- One Kit Required for each 16K of Expansion -

TRS-16K3 200ns for Color & Model III. . . \$6.29

TRS-16K4 250ns for Model I..... \$5.49

TRS-80 Color 32K or 64K Conversion Kit

Easy to install kits come complete with 8 ea. 4164-2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 color computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K2..... \$11.95

NEW! TRS-80 Model IV 64K or 128K Conversion Kit

Easy to install kit comes complete with 8 ea. 4164 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K2..... \$11.95

(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only)..... \$29.95

(8-4164's with PAL Chip to expand from 64K to 128K)



ULTRA MAGNETICS 5 1/4" DISKETTES

All diskettes are soft-sectored w/hub rings. Buy prices available on request
SSDD Single Sided Double Density • DSDO Double Sided Double Density

Part No.	Description	Boxed	Price
UM51401	SSDD with Hub Ring	10	\$14.95
UM52401	DSDO with Hub Ring	10	\$18.95

Disk Minder DM75 Stores 75 (5 1/4") Diskettes. . . \$14.95

We also specialize in integrated circuits, custom cables,
power supplies, keyboards, and much, much more!
Give us a call today!

\$10.00 Minimum Order - U.S. Funds Only CA Residents Add 6 1/2% Sales Tax Spec Sheets - 30¢ each
Shipping - Add 5% + \$1.50 Insurance Prices Subject to Change Send S.A.S.E. for Monthly Sales Flyer
Send \$1.00 Postage for your FREE 1985 JAMECO CATALOG!



Mail-Order Electronics • Worldwide
Jameco
ELECTRONICS



1355 SHOREWAY ROAD, BELMONT, CA 94002
9/85 Phone Orders Welcome (415) 592-8097 Telex: 176043



Rose

You've Got

TOTAL ACCESS

(specializing in TRS-80 's)

TO YOUR COMPUTER HARDWARE & SOFTWARE NEEDS. CALL ROSE TODAY!

QUALITY DISK DRIVES

These drives are complete with power supply, cover and external drive connector. For TRS-80 Model I, III, 4, IBM PC and others. All drives are Double Density and step at 8ms or less. SS means single head, DS is double head. Specify white or silver color cover. Add \$6 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor.

COMPLETE FULL SIZE 5.25" DISK DRIVES

40tk Single Side Tandon TM100-1	\$ 187
40tk Dual Side Tandon TM100-2	197
80tk Dual Side Tandon TM101-4	297

COMPLETE HALF-HIGH 5.25" DISK DRIVES

1ea. 40tk SS TEAC FD-55A in dual case	\$ 167
2ea. 40tk SS TEAC FD-55A in dual case	317
1ea. 40tk DS TEAC FO-55B in dual case	187
2ea. 40tk DS TEAC FO-55B in dual case	357
1ea. 80tk OS TEAC FO-55F in dual case	217
2ea. 80tk DS TEAC FO-55F in dual case	387

COMPLETE 5" DRIVES

Add \$10 shipping

2ea. SS TM848-1E's in dual case with fan	\$ 647
2ea. OS TM848-2E's in dual case with fan	697

BARE 5.25" & 5" DRIVES

Add \$4 shipping

40tk SS, Full Size, Tandon TM100-1	\$ 127
40tk OS, Full Size, Tandon TM100-2	187
80tk OS, Full Size, Tandon TM101-4	287
40tk SS, Half-High, TEAC FO55-A	147
40tk OS, Half-High, TEAC FO55-B	187
80tk DS, Half-High, TEAC FO55-F	237
8" SS, Thinline, Tandon TM848-1E	259
8" DS, Thinline, Tandon TM848-2E	333

TRS-80 MODEL III/4 DISK KITS

Internal drive kit complete with disk controller, power supply, mounting brackets, cables and all hardware plus step-by-step instructions. This kit contains everything you need (except the Disk Operating System, drive and a screwdriver) to convert your cassette Model III or 4 to fast reliable disk operation. Don't confuse this quality kit with the high-priced ripoffs. Thousands of satisfied customers cannot be wrong. You can join them for only.....

Add \$2 shipping

Same as above with 1-40tk SS drive.....299

Same as above with 2-40tk SS drives.....419

TRS-80 MODEL I

DOUBLE DENSITY CONTROLLERS

Add \$3 shipping

Aerocomp "DDC" Really the best by test	\$ 99
Aerocomp "DDC" with LDOS	159
Aerocomp "DDC" with NEWDOS 80-v2.0	179

OTHER DRIVE DOODIES

Add \$2 shipping

TRSDOS 1.3 Disk & Manual for Model III	\$ 24
TRSDOS 2.3 Disk & Manual for Model I	24
TRSDOS 5 x Disk & Manual for Model 4	19
LDOS for the Model I or III	89
NEWDOS 80 v2.0 for the Model I or III	99
2-drive cable for Model I/III/4	24
2-drive external cable for IBM PC	48
4-drive cable for Model I	34
Extender cable, 7' long	9
5.25" power supply & encl., white or silver	68
8" power supply, fan & enclosure, beige	149

TRS-80 SPECIAL EQUIPMENT

12" Green Phosphor Monitor	79
12" Amber Phosphor Monitor	84
18K 200 nsec RAM Guaranteed 1 year (8 chips)	9
64K 200 nsec RAM Guaranteed 1 year (8 chips)	34
64K RAM plus Genuine PAL for Model 4 upgrade	44

MEDIA & SUPPLIES

5" Diskettes SSDD, Lifetime Guar. Pack of 10	\$ 18
5" Diskettes OSD, Lifetime Guar. Pack of 10	19
5" Flipport, holds 75 Diskettes	19
8" Diskettes SSDD, Lifetime Guar. Pack of 10	29
8" Diskettes OSD, Lifetime Guar. Pack of 10	34
8" Flipport, holds 50 Diskettes	24
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb Tractor Paper, 2900 sheets	25

ROSE GETS RIGHT! NOW---ROSE'S MOD 4 CP/M \$ 69

Complete with Manual

Rose has latched onto this slick version of CP/M 2.2 that allows you to run most of your favorite CP/M programs with ease. It even lets you read and write other manufacturers' disk formats. What could be nicer? They are in stock ready for you to use and enjoy.

PRINTERS & ACCESSORIES

PROWRITER 120cps, 10" Wide Fract/Tractor	319
PROWRITER 2, 120cps, 15" Wide Frct/Trc	595
STARWRITER F10-40cps Daisy Wheel	895
LPRINTMASTER F10-65cps Fast Daisy Wheel	995
Rutishauser Bidirectional Tractor	150
Rutishauser Sheet Feeder, A Best One	495

CP/M & 80 COLUMN for your MODEL III

No need to buy a new computer when you can use the Holmes VID-80 modification and get CP/M 2.2, 64K RAM and 80 column video. This kit is easy to install and requires no soldering. Even a dolt like you can end up with a complete 64K CP/M computer with an 80 column screen that is still able to run all your existing Model III software. For the first time you will be able to use CP/M programs that normal people do, such as dBASE II and WordStar. The regular price of this kit is \$524. Now Rose will get you going for only.....

Add \$6 shipping

SUPER SALE

I'll ship you the Holmes deal above PLUS WordStar 3.3 installed and ready to run for only.....

SPECIAL SOFTWARE DEALS

Add \$4 shipping

WordStar 3.3 (Specify MM or R/S format)	\$ 195
MailMerge, SpellStar, Starindex, all 3 for just	99
WordStar Professional (Above 4 Programs)	275
DataStar Date Entry & Retrieval	125
ReportStar Report Generator	105
InfoStar Advanced DBMS (Above 2 Programs)	195
dBASE II Complete With Disk Tutorial	345
Super Utility Plus 3.2 by Kim Wett	59
CP/M 2.2 for Model 4 by Monte Zuma	169
Turbo PASCAL by Bor Land Requires CP/M	44
Turbo Toolbox by Bor Land	45
Turbo TUTOR by Bor Land	35
Pickles & Trout CP/M 2.2m for the Model	
2-12-18 Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

ORDER NOW! TOLL-FREE

800-527-3582

Orders Only Please

Call in your order or write to us at the address below. Texas residents call us at 214-337-4346 and deduct \$2.00 from your order but you should remind me 'cause sometimes I forget. If you need technical information or service please call the Texas number as the Toll Free lines are just for orders only. Prices are subject to change without notice and are mail order only. I accept AMERICAN EXPRESS, MASTERCARD and VISA and I will not charge your card until I ship your goodies. You can send a check or a money order. I also accept C.O.D. orders but they require cash or a cashier's check upon delivery. If shipping charges are not shown please call for the correct amount. Add \$5.00 handling charge if your order is less than \$50.00. Shipping charges quoted in this ad are for the lower 48 states only. Orders to Canadian address add \$20.00 to pay for doing all those papers for customs. Texans add State Sales tax. No tax collected on shipments outside of Texas. Be sure you know what you are buying. SOFTWARE IS SOLO ON A REPLACEMENT BASIS ONLY - NO REFUNDS. If it is defective call us for instructions. Please order from me now---I need the money and I will not jack you around. I reserve the right to charge up to a ten percent restocking charge if you jack me around. All merchandise carries the original manufacturers' warranty and all repairs or adjustments will be made by the manufacturer or his designated representative.

NEXT DAY SHIPMENT of Goods in Stock

TOTAL ACCESS

P.O. Box 790276

Dallas, Texas 75379

214-337-4346

```

630 GOSUB 60900: CLS:PRINT "Press a key to see the
captured screen"; GOSUB 200
640 CLS: FOR I% = 0 TO 14: PRINT QS(I%): NEXT I%:
PRINT QS(15);: GOSUB 200: RETURN
650 '
660 Q% = 0: GOSUB 60950: CLS: PRINT "Screen Swap --
Model 4/4P in Model III Mode only!"; PRINT "Type
something then press <CLEAR>"; GOSUB 60600
670 Q% = 1: GOSUB 60950: CLS: PRINT "Type something
else, then press <CLEAR>"; GOSUB 60600: Q% = 0:
GOSUB 60950
680 PRINT @960-Q%*10, "Press 'S' to swap screens, 'Q'
to quit";: GOSUB 200
690 IF INSTR("Qq",A$) THEN RETURN ELSE IF
INSTR("Ss",A$) THEN Q% = NOT Q%: GOSUB 60950
700 GOTO 680
710 '
60000 ' Model 3 Version -- -- Data handling
subroutines. Be sure to initialize routines
with GOSUB 61000 before use
60090 ' Formatted input -- shows input field with ' '
characters and restricts number of characters
user may enter. Calling sequence: Q% = length
of input field (1 - 254)
60099 ' GOSUB 60100 Input string returned in QS
60100 IF Q% < 1 OR Q% > 254 THEN RETURN ELSE
QS = STRING$(Q%+1,32): DEFUSR% = VARPTR(Q%+1):
Q% = USR%(VARPTR(QS)): RETURN
60101 '
60199 ' Strip blanks from end of a string Calling
sequence: QS = string to strip GOSUB 60200
String returned in QS
60200 DEFUSR% = VARPTR(Q%+1): Q% = USR%(VARPTR(QS)):
RETURN
60201 '
60299 ' Convert lowercase characters in a string to
uppercase Calling sequence: QS = string to
convert GOSUB 60300 String returned in QS
60300 DEFUSR% = VARPTR(Q%+1): Q% = USR%(VARPTR(QS)):
RETURN
60301 '
60397 ' CAPS-Lock utility: turn CAPS on or off, or
test present condition. Calling sequence: Q% =
function request (0 = turn CAPS off 1 = turn
CAPS on 2 = test present state)
60398 ' GOSUB 60400 If test function is chosen then
Q% returns present state: Q% = -1 (true) means
CAPS on Q% = 0 (false) means CAPS off
60400 Q% = &H4019: IF Q% >= 0 AND Q% < 2 THEN POKE
Q%,Q% ELSE Q% = (PEEK(Q%)>0)
60401 RETURN
60402 '
60499 ' Scroll protect -- protects 0 - 7 lines at top
of screen from scrolling (but not from CLS)
Calling sequence: Q% = number of lines to
protect GOSUB 60500
60500 POKE &H4214,Q%: RETURN
60501 '
60599 ' Full screen input -- user can freely move
around screen and enter input anywhere <Shift>
+ arrow moves cursor non-destructively. Calling
sequence: GOSUB 60600
60600 DEFUSR% = VARPTR(Q%+1): Q% = USR%(Q%): PRINT
CHR$(15);: RETURN
60601 '
60699 ' Copy screen row to a string Calling sequence:
Q% = row of screen to copy (0 - 23) GOSUB 60700
String returned in QS
60700 QS(16) = " ": Q% = VARPTR(QS(16)):
Q% = &H3C00+Q%*64: POKE Q%,64: POKE Q%+1,Q%
AND 255: POKE Q%+2,INT(Q%/256): QS = QS(16):
RETURN
60701 '
60799 ' Full screen capture -- -- Capture all screen
characters in array or 64-character strings.
Calling sequence: GOSUB 60800 Screen returned
in QS(0) through QS(15)
60800 FOR Q% = 0 TO 15: GOSUB 60700: QS(Q%) = QS: NEXT
Q%: RETURN
60801 '
60899 ' Full screen capture as above - each string in
QS() array is stripped of trailing blanks.
Calling sequence: GOSUB 60900 Screen returned
in QS(0) through QS(15)
60900 FOR Q% = 0 TO 15: GOSUB 60700: GOSUB 60200:
QS(Q%) = QS: NEXT Q%: RETURN
60901 '
60949 ' Screen Swap -- For use ONLY on a Model 4/4p
in Model III mode! Calling sequence: Q% = page #
(even for page 4 odd for page 1) GOSUB 60950
DEFUSR% = VARPTR(Q%+1): Q% = USR%(Q%): RETURN
60950 '
61000 ' Initialization for Model 3 subroutines GOSUB
61000 once at beginning of program
61001 DATA MODEL3
61002 RESTORE
61003 READ QS: IF QS <> "MODEL3" THEN GOTO 61003
61004 '
61100 ' Routine 1 -- Formatted input
61101 DATA 32717, -4854, 8283, -6840, 10133, 8965,
9086, 28518, 16069, -13010, 51, -1264, -11839,
21485, 16416, 16589, 14336, 30723, 536, 62,
38689, 201

```

Listing 2 continued on p. 104

MISOSYS

PRO-fessional Software

for Model 4

NEW for 1985!

PRO-NTD

WINDOW & APPLICATION MANAGER

- o User definable activation character
- o Up to four nestable windows
- o Export and import of data across windows
- o Function key invocation of applications
- o Online HELP facility
- o LIB EXEC gives access to DOS LIB commands
- o ADDRESS rotating cards and mailing labels
- o BRINGUP tickler file and appointment book
- o CAL month at a glance perpetual calendar
- o A four function Floating Point CALCulator
- o Seven function RPN CALC in base 2, 8, 10, 16
- o 3 x 5 CARD filer and notepad
- o CHARSET computer character set table
- o Telephone list and autoDIALER
- o DOSAVE screen to disk saver
- o TERM mini-terminal facility
- o PSORT utility to sort data files
- o WINLINK device driver access from BASIC
- o Requires 128K 4/4p TRSDOS 6.2 or equivalent

\$59.95; S&H \$3 US, \$4 Canada, \$10 Foreign

\$49.95 Special Introduction Offer until August 31st!

MRAS

MRAS - Relocating Macro Assembler

- o Generates Microsoft compatible /REL files
- o 16-bit external references.
- o Powerful Macro support: REPT, IRP, IRPC
- o Nested include/get files.
- o Nested conditionals.
- o Upwardly compatible with MAS.
- o Fast binary-searched symbol table.
- o MLIB REL/IRL librarian included.
- o MLINK linker supports virtual memory file, REL and IRL library search, does not generate object code for DS regions.
- o SAID full-screen text editor included.

Specify: PRO-MRAS 4/4p; MRAS Model I/III
\$74.95; S&H \$3 US, \$4 Canada, \$10 Foreign

COD add \$1.75, VA residents add 4% Sales Tax

MISOSYS, INC

P. O. Box 239
Sterling, VA 22170-0239
703-450-4181

TRSDOS is a trademark of Tandy Corp.

DRAWING IN DETAIL

by Jim Abbassian and Glen E. Sparks

MacPaint-style graphics bring out the best in your Model III or 4 high-resolution board.

I wish my computer could do graphics like that." Maybe Model III/4 owners don't say that out loud, but they probably think it when they see an Apple Macintosh or a Tandy 1000 in action.

You don't have to put up with that gnawing feeling of inadequacy. By installing Radio Shack's high-resolution board, you'll be the envy of the neighborhood, with graphics that outshine an IBM PC's with 18 percent higher resolution.

Rembrandt is a Model III/4 icon-driven high-resolution (hi-res) graphics program that gives you a plethora of drawing and editing commands (see Program Listing 1). It lets you:

- Draw line figures.
- Paint sections of the screen with 16 patterns.
- Mix text and graphics.
- Manipulate predefined geometric shapes, including rectangles, circles, polygons, cones, and cylinders.
- Cut and paste; that is, define a section of the screen and duplicate it elsewhere.
- Save screens to disk or dump them to a Radio Shack dot-matrix printer with dot-addressable graphics capability.
- Erase the screen pixel by pixel or all at once.

As you read the documentation below, you'll get an idea of Rembrandt's potential for design, business, and entertainment applications. You can modify the program for special needs, such as architectural drawing, model design, and mapping.

In the Beginning...

While Rembrandt isn't hard to use, you'll need a few practice sessions to master it. If you start by trying to create an on-screen version of the Mona Lisa, you'll become frustrated and confused.

Type in and run Program Listing 1 from BasicG. (The high-resolution board comes with BasicG, which supports a number of GW-Basic commands.) Don't save the program in ASCII format; some lines will become too long to load, causing a "Direct statement in file" error.

After a pause for initialization, you'll see Rembrandt's icon menu to the left and a pattern menu along the bottom of the

screen (see Fig. 1). The rest of the screen is free for graphics.

Rembrandt has three modes: the cursor, function, and paint modes. In each mode, the cursor changes its appearance to indicate which mode you're in. In the cursor mode, the cursor is arrow-shaped and movable. In the function mode, it changes to a stationary inverse-video arrow; here, control passes to the icon menu so you can choose a function. In the paint mode, the cursor becomes a stationary spray can.

A La Mode

On boot-up, Rembrandt starts out in the cursor mode. You use this mode to position the cursor only, to get it where you want to start drawing on the screen. The arrow keys move the nondestructive cursor around the screen in a total of eight directions. Use single keys to move up, down, right, and left; combine keys to move diagonally.

To create and manipulate shapes, you switch to Rembrandt's function mode, with its icon menu on the left of the screen. Press the spacebar once to enter this mode; the cursor changes to inverse video. Use the arrow keys to position the cursor on the icon of interest. Rembrandt highlights each icon as the cursor travels through it.

Pressing the spacebar again returns the cursor to its previous position and invokes the highlighted function. If, for example, you choose the Circle function, the circle's center is at the cursor's on-screen position. To exit the function mode and restore cursor control, hit the spacebar again.

Iconography

I'll take you through the function menu icon by icon, starting in the upper left-hand corner. Refer to Fig. 1 if you don't have Rembrandt up on your computer.

The first icon represents the Line function, which draws lines one at a time. To see how it works, get into the function mode by pressing the spacebar, use the arrow keys to get to the line icon, and

press the spacebar again. The line starts at a fixed point, determined by the cursor's position when you entered the function mode. You control the second endpoint by using the arrow keys to extend the line and give it direction.

To make a freehand line drawing, alternately enter the line mode, draw a line, exit to the function menu, then select the Line function again, starting your new line where the last one left off. This sounds involved, but it actually takes only a few seconds.

The second function, the Eraser, lets you clear the screen selectively, just like a blackboard. As you move the eraser around the screen with the arrow keys, you permanently delete everything it passes over.

The Triangle function is a little tricky, but useful. One vertex is fixed at the cursor's position. You can manipulate the other two vertices, but only one at a time. Press the enter key (hold it down, don't just tap it) to switch between the two variable endpoints, and use the arrow keys to pivot the triangle or change its size. You can also draw triangles with the Line function, or with the Polygon function, described below.

The Box/Rectangle function works like the Line function. The cursor's position defines the top left corner of the box. You control the opposite corner and use the arrow keys to change the box's length and width.

The Circle function draws circles or ellipses. The up- and down-arrow keys control the X, or horizontal, axis; the left- and



System Requirements

Models III and 4

84K RAM

BasicG

High-resolution board

Dot-matrix printer optional

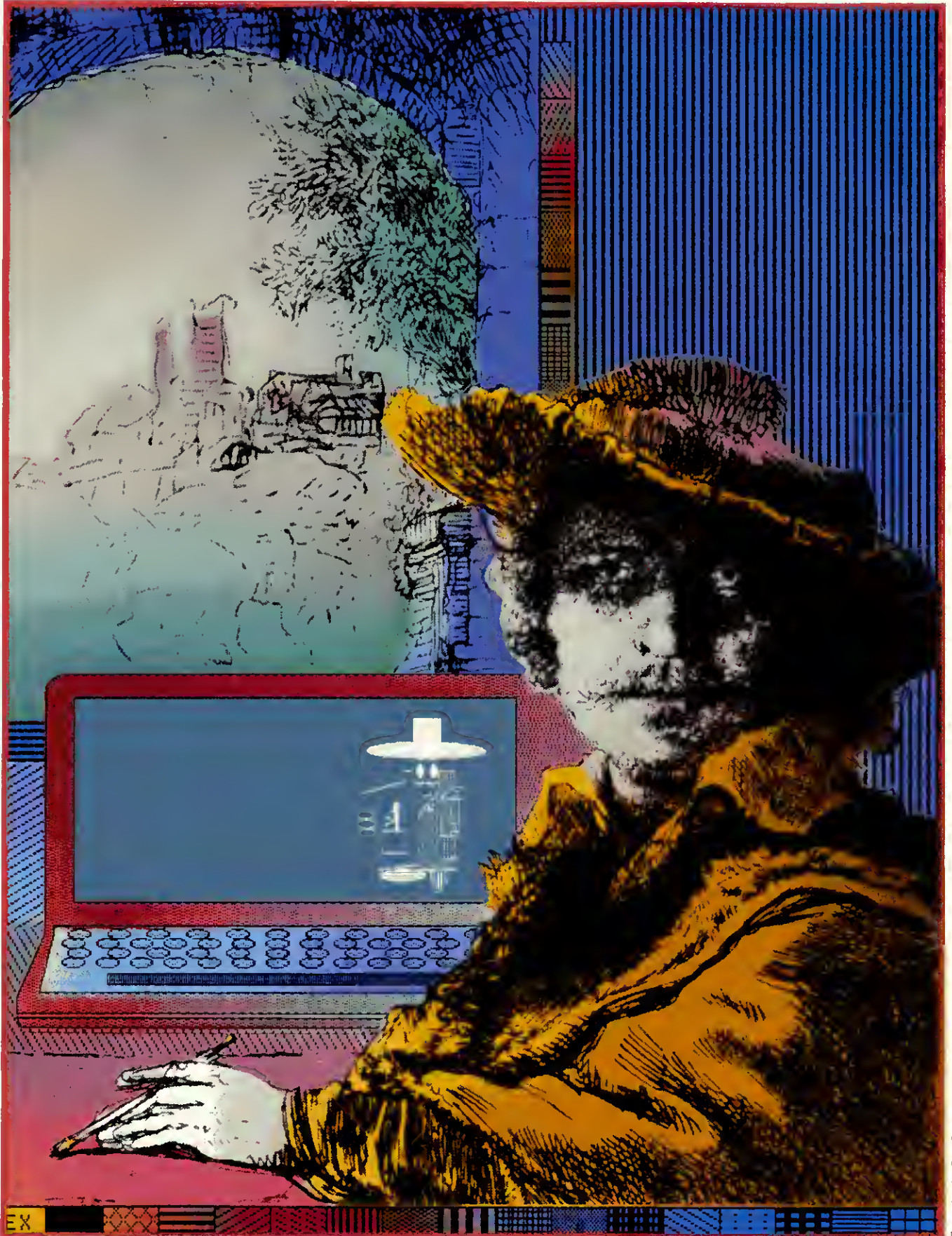


Illustration by Phil Geraci

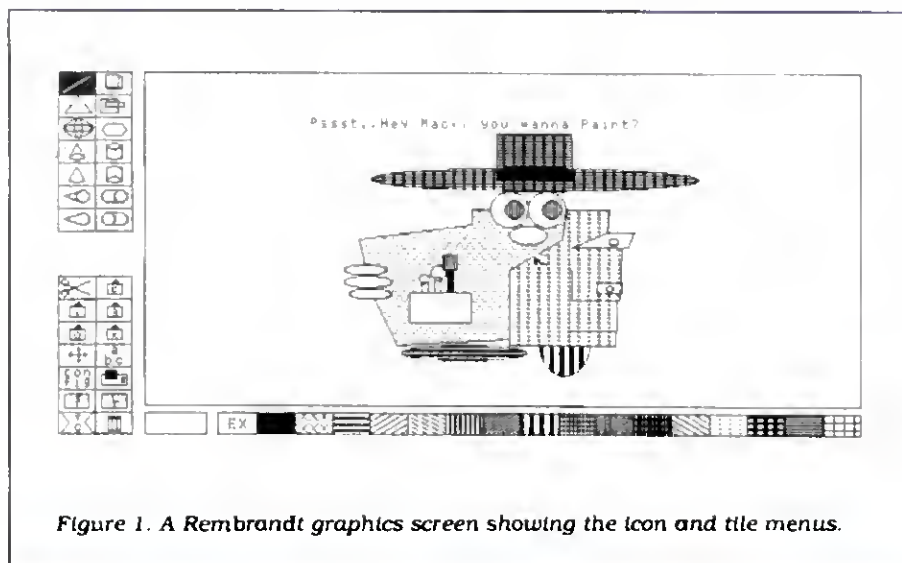


Figure 1. A Rembrandt graphics screen showing the icon and tile menus.

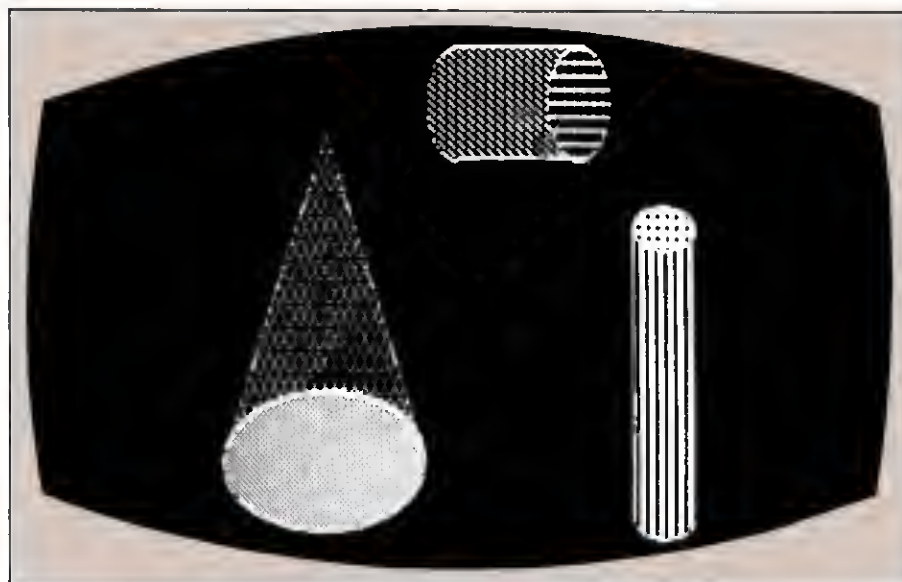


Photo 1. Geometric figures automatically drawn by Rembrandt.



Photo 2. Demonstration of cut-and-paste function: Dotted lines indicate area to be pasted.

right-arrow keys control the Y, or vertical, axis.

You can use the next function, the Polygon, to create a regular polygon of any size and shape. The left- and right-arrow keys change the figure's size. The up- and down-arrow keys control the number of sides. The lower and upper limits to the number of sides are three (a triangle) and 20 (roughly a circle). You can increase the number of sides to more than 20, but your figure won't look much different from a 20-sided one, and will take longer to draw.

The rest of the icons in the top half of the function menu represent a variety of cones and cylinders. You control the lengths of vertical shapes with the up- and down-arrow keys and change their radii with the left- and right-arrow keys. You control horizontal cones or cylinders in a similar manner. Photo 1 shows three figures drawn using these functions.

Impeccable Paste

The bottom half of the function menu begins with several Cut-and-Paste icons, which let you move or duplicate parts of your graphics screen.

First, move the cursor to the upper left-hand corner of the section you want to cut and paste. Now select the Cut function using the scissors icon. Use the arrow keys to adjust the dotted-line box until it surrounds the area you want to cut and press the spacebar (see Photo 2). The dotted lines should disappear, indicating that the figure is stored in the buffer. If they don't, reduce the size of the outlined area and try again.

The area inside the box doesn't move. Rembrandt reproduces the image and stores it in memory. You can paste the image elsewhere on the screen using the five Paste functions, shown on the menu as paste bottle icons.

Move the cursor to where you want to paste the stored image. Now select one of the paste functions. The "P" bottle pastes an image exactly like the original, overwriting anything else on that part of the screen. The "I" bottle pastes an inverse-video image of the memory buffer, meaning the whole area in the dotted box.

The "A," "O," and "X" paste bottles compare the image on screen to the image in the buffer using the Boolean operators And, Or, and XOR. This means you can combine images or select parts of the stored image to display.

You can reverse the pasting process by pasting with the "X" bottle twice. This restores the screen to its original condition.

Once you've captured an image in memory, you can paste it over and over again using different paste bottle options (see Photo 3).

Text Talk

You can add text to your graphics screen using the ABC and crossed-arrows icons. Use ABC to select the Text function, then go to the crossed arrows to select the

TRS-80™ MODEL 1, 3, AND 4 SOFTWARE

TYPITALL Word Processor \$129.95 TYPITALL with Spelling Checker \$179.95

Word Processor upwardly compatible with SCRIPSIT — it reads your old SCRIPSIT files and uses the formatting and cursor movement commands you are already familiar with. But it is a completely new word processor with so many advanced features that we can't even mention all of them here.

Send **any** control or graphic/special character to the printer. Control/graphic characters included **in the text** so that you have complete control of all features of your printer. Print the formatted text **on the screen** before going to the printer. Send formatted text to a **disk file** for later printing. **Merge** data from a file during printing. Names, addresses, and other text can be inserted during printing. No need for a separate program for "mail merge" capabilities. Print while editing (spooling). Assign **any sequence of keystrokes** to a **single** control key. Call up to 16 **help screens** at any time. **Move cursor** forwards or backwards by character, word, line, or page. **Reenter** the program with **all text intact** if you accidentally exit without saving the text. Optional spelling checker comes with 29,500 word dictionary. Verify a 3,500 word document in **less than two minutes**. True Model 4 (80 x 24 display, TRSDOS 6) and Model V/III versions.

SYSTEM DIAGNOSTIC \$99.95

Is your computer working correctly? **Are you sure?** System Diagnostic has complete tests for every component of your TRS-80 Model 1, 3, or 4 (separate versions necessary for each model).

ROM: checksum test. **RAM:** three tests including every location and data value. **Video display:** character generator, video RAM, video signal. **Keyboard:** every key contact tested. **Line printer:** character tests with adjustable platen length. **Cassette recorder:** read, write, verify data. **Disk drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single or double density, 1-99 tracks. **RS-232-C Interface:** connector fault, data transmission, framing, data loop, baud rate generator.

SMART TERMINAL \$74.95

The **Intelligent** telecommunications program for your TRS-80 Model 1, 3, or 4, or Model 2 CP/M. **Memory buffer** for sending and receiving files. **Automatic transmission** of outgoing data. **Automatic storage** of incoming data. **Character translations**. True BREAK key. Help screens, line feed filters, echo and line printer toggle switches, and more.

TRS-80™ MODEL III ASSEMBLY LANGUAGE \$16.95

A complete course in assembly language, written for the **beginner**. Contents include: The Z-80 instruction set; TRS-80™ Model III ROM and RAM; using the Editor/Assembler; reading, printing, and moving data; arithmetic operations with integers; floating-point and BCD numbers; logical and bit operations; cassette input and output; USR subroutines in BASIC; RS-232-C data communications; disk input and output; the TRSDOS 1.3 disk operating system.

MONITOR #5 \$22.95 Book and MONITOR #5 \$29.95

A comprehensive machine language monitor and debugging program. **Display** memory in ASCII or hexadecimal format. **Disassemble** memory to show machine language commands. **Move and compare** blocks. **Search and modify** memory. **Relocate** machine language programs. Read and write **cassette tapes**. **Unload** programs in low RAM on disk. **Print** optionally on video display or line printer. **Save and load** disk files. **Input and output of disk sectors**, bypassing disk operating system. **Complete debugging package**, including setting and displaying registers, single stepping through machine instructions, setting breakpoints, and executing machine language operations.

TRS-80™ - TANDY - MS-DOS IBM - CP/M SOFTWARE

SMALL BUSINESS ACCOUNTING \$99.95

Newly revised, this program is based on the **Dome Bookkeeping Record #612**, and handles **general ledger** and **payroll** for a small business. Category breakdowns are provided for both income and expenses. Monthly, through last month, and year-to-date summaries computed. Start the fiscal year with any month.

Payroll section handles up to 99 employees. Automatic computations for F.I.C.A., federal and state income tax. Three optional deductions also included. Print both payroll and expense checks using same forms. Reports include monthly, quarterly, and year-to-date summaries, 941 and W-2 forms. Simple and easy to learn — ideal for first-time computer users.

HOME BUDGET and CHECKBOOK ANALYST \$59.95

A complete checkbook program together with budgeting, income and expense analysis, comparisons, and projections. Enter and print checks, enter deposits, and compute your current checking balance. Program also handles non-check expenses, bank debits, and income. Monthly and year-to-date summaries and yearly projections based on data through a known month. Monthly expenses compared to a pre-established budget.

MAILING LIST \$69.95

Build and maintain mailing lists of up to as many names as you can fit on standard diskettes (1,250 for TRSDOS and CP/M, 2,500 for MS-DOS). Four-line labels with optional line that can be used either for unprinted data or as part of the label. Add, change, delete, or find names. Sort according to data in **any** field. Print labels in 1, 2, 3, or 4 adjustable columns.

SMALL BUSINESS MANAGEMENT SYSTEM \$299.95

A complete **point-of-sale** program for a small business. Handles **order entry, invoicing, inventory, and bookkeeping**, including general ledger, accounts receivable, and accounts payable. Includes up to 999 8-character part numbers. Items deducted from inventory when orders entered. Handles both customer accounts and single orders. Invoices printed on forms or plain paper and include discounts, sales taxes, and shipping and handling charges. General ledger produces monthly and year-to-date totals. Receivables tracked to invoices, automatically updated as income entered. Inventory reports track sales by part numbers.

HOWE SOFTWARE

14 Lexington Road

New City, New York 10956

Information and same day orders

(914) 634-1821

24-Hour TOLL-FREE 1-800 Number

outside California

(800) 428-7825, ext. 169

inside California only

(800) 428-7824, ext. 169

When ordering, please give your computer model number

Prints checks with Memo Check (C) Howe

Software and printing, 14141 Central Expressway, Suite 300

San Jose, California 95131

© 1984 Howe Software

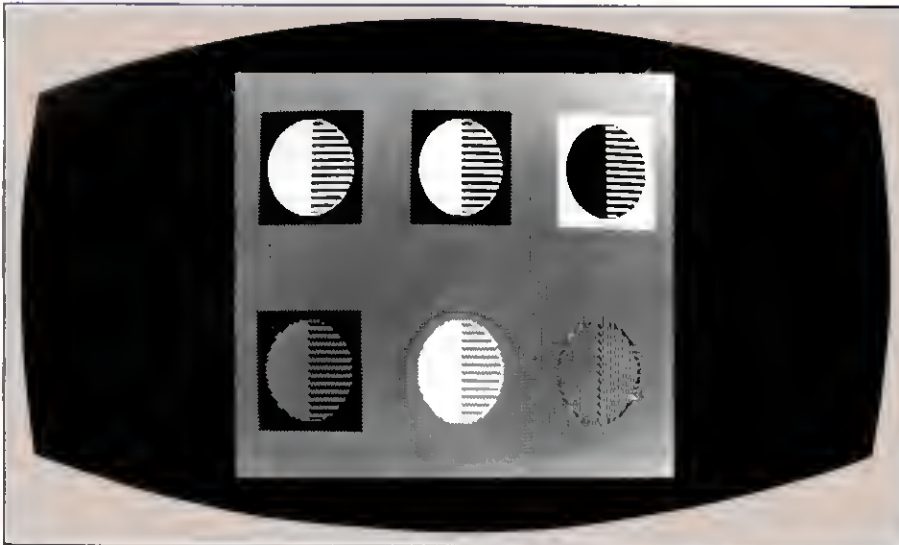


Photo 3. Demonstration of cut-and-paste feature: The original design in the upper left-hand corner is pasted using (left to right from the middle of the top row) the "P," "I," "A," "O," and "X" options.

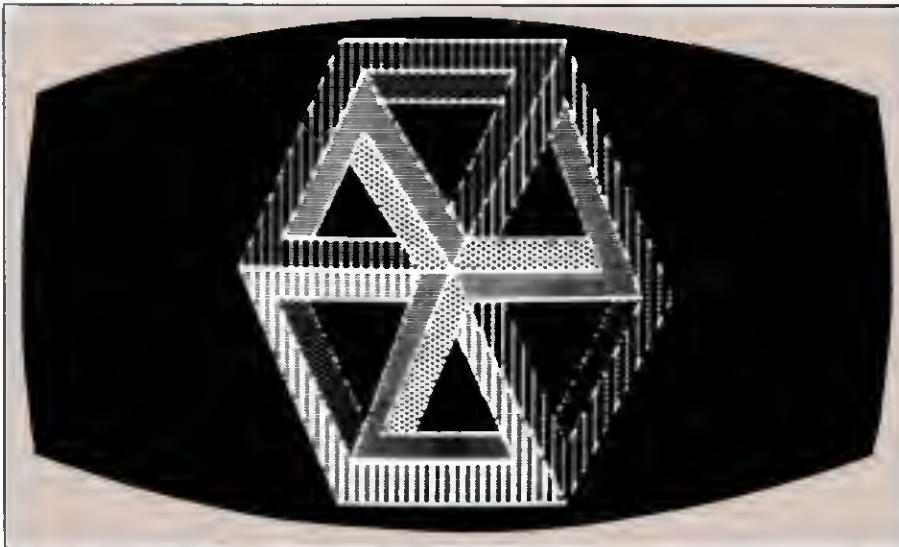


Photo 4. Hexagon design corresponding to Program Listing 3.



Photo 5. Computer design corresponding to Program Listing 4.

direction in which the text reads. To switch directions, press the appropriate arrow key. Normally, you'll get text in capital letters; for upper- and lowercase text, press shift-zero.

You automatically exit the text mode if you try to type off the edge of the graphics screen. Otherwise, this is the only function you exit by pressing the enter key.

One note: This feature has a long error-checking routine, so you Model III owners had better keep your typing speed down, or you'll lose characters. Model 4 owners, your increased CPU speeds means you can type rather quickly.

Output to Disk or Printer

The CONFIG icon is the only function that calls up another menu. The CONFIG menu's first option lets you change cursor speed. Choose low values for slow, precise cursor movement or high values for speedier movement.

The other options are for the Model 4: they define which printer driver you use for a screen dump to your Radio Shack DMP printer. GPRINT turns your picture sideways and flattens it out a bit. GPRT2 and GPRT3 are similar drivers that don't rotate the image, but you have to set your printer to condensed mode or use 15-inch paper with them.

The Printer icon is for Model 4 owners only; select your printer driver using the CONFIG function, then invoke the Printer function to dump the screen to your dot-addressable Radio Shack DMP printer.

Model III users can't print out from the function menu. If you want a screen dump, press the break key, then type in RUN. After Rembrandt erases the menus, press the break key again before they reappear on the screen. Now you can type in GPRINT, GPRT2, or GPRT3 for a screen dump, or type in CMD"I" to exit to TRSDOS.

Even after you exit to DOS, Rembrandt doesn't erase your graphics screen. At DOS ready, type in GRON to display the screen. At this point you can dump it to the printer using the GPRINT option.

The "S" and "L" icons let Model 4 users save and load graphics files. When you invoke the "S" function, the program displays a directory of files with the extensions /GR or /HR, then prompts you for a file name and saves the file to disk. Use the "L" function to load files from disk.

It's not that easy on a Model III. You can't save or load graphics from Rembrandt, so you must complete a picture in one sitting (blame TRSDOS 1.3, not our program). To save a screen to disk, type in GSAVE FILE NAME from TRSDOS Ready. To load a file, type in GLOAD FILE NAME. The GRON command displays your picture on the screen; GROFF turns the display off. You can also print a screen you've loaded from disk; use the printer drivers discussed above.

Saving a graphics screen to disk takes up 75 records and 25 granules, so make sure you have enough room on your disk.

The Tandy logo icon returns you to DOS with no questions asked. Be careful around this one.

The Garbage Can function erases the entire graphics screen, again with no questions asked.

The Paint Box

So much for the function mode. The paint mode lets you fill in any enclosed area of your design with one of the bit-mapped patterns, or tiles, shown at the bottom of the screen. This method is called painting or tiling.

After you've drawn a figure or two, move the cursor inside an area you want to paint. Tap the enter key to invoke the paint mode. Indicated by a spray can cursor. Use the right- and left-arrow keys to scroll through the tile menu; you'll see the patterns change in the box to the left of the menu. When the pattern you want appears in the box, press the space bar. Rembrandt fills the area containing the spray can with that pattern and returns you to the cursor mode.

The tile menu's Exit option lets you escape without painting. Just press the space bar when you see the word "exit" in the tile selection box.

Make sure you completely enclosed the area you paint. Otherwise, the paint bleeds out and covers the rest of your graphics screen.

Footnotes

If Rembrandt happens to crash but doesn't return you to DOS, type in RUN and the program will reinitialize without erasing the graphics screen.

The three screen dump routines, GPRINT, GPRT2, and GPRT3, that come with the hi-res package work with Radio Shack's DMP series printers. These printer drivers are in Assembly-language and BasicG calls them as external programs. They might not work with non-Radio Shack printers. However, the BasicG manual prints their complete listings. You should be able to modify one of them to suit your hardware's configuration.

Getting Fancy

We'll touch briefly on a way to create more complicated pictures using the hi-res board and BasicG. Run Program Listing 2 and send it to the printer. You'll get a grid corresponding to the screen's pixels. Cover the grid with plastic and use a grease pencil to transfer an image to the grid.

You can plot out the design and write a BasicG program that draws the picture. It's even more tedious than it sounds, but the results are impressive. Program Listing 3, for example, produces the geometric shape shown in Photo 4. Program Listing 4 draws the computer shown in

NEW! HARD DISK FOR TANDY® 1000* AT PRICES THAT MAKE SENSE

\$599

**10 MB
Internal**

*Controller, Drive
Cables, & Manual*

\$729

**10 MB
External**

*Controller, Drive
in enclosure
with fan and
power
supply Cables,
& Manual*

**5 MB
Internal**

*Controller, Drive
Cables, & Manual*

**20 MB
Internal**

*Controller, Drive
Cables, & Manual*

\$399

**20 MB
External**

*Controller, Drive in
enclosure with fan
and power supply,
Cables, & Manual*

\$799

\$959

No surcharge for COD, American Express, Visa or MC

Easily user-installed-fully documented instructions.

System "boots" from hard disk without floppy.

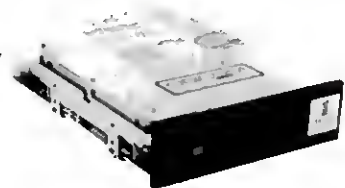
Runs Tandy 1000 software and much more.

**NO RISK. . . Same day exchange policy on
any returned merchandise.**

Orders and Information Call:
1-800-922-0881 TOLL FREE
201-540-0144 IN NEW JERSEY
or Write:

Cx

18 Bank Street
Morristown, N.J.
07960



COD No Surcharge Visa & MC 3% Amex 5%

* Requires Memory Expansion Board with DMA Controller (25-1004) and IBM PC-DOS or Tandy 1200 HD-DOS
Tandy is a registered trademark of Tandy Corporation
IBM is a registered trademark of International Business Machines

FAST

HARD DISK BACK UP

**FOR TANDY
II/12/16/6000
(TRSDOS™, XENIX®,
or CP/M®)**

How much would you lose if a power failure, hardware glitch, or other disaster damaged or destroyed your hard disk data files? How long would it take to reconstruct them? How would the loss affect your business?

SNAPBACK can't prevent a disaster. But it can back up your hard disk so quickly and inexpensively that you can always be prepared for the worst. This is possible because SNAPBACK is...

- **FAST.** It copies 1.5 (Mod. II) to 2.4 (Mod. 12/16/6000) Mbytes of data per minute to 8" floppy disks. Thus, you can back up a 15 Mbyte drive in as little as 7-8 minutes.
- **FLEXIBLE.** It works with any Model II/12/16/6000, any 8.7/12/15/35 Mbyte Tandy drive, and any XENIX, TRSDOS, and/or CP/M data.
- **EASY.** Its menus make it a snap to back up or restore your data (with optional verification).
- **INEXPENSIVE.** It only costs \$125.00.

If you value your data, you need SNAPBACK. It's the best insurance available.

The SNAPBACK package includes two bootable disks and complete documentation. To order, phone or write today.

(Mastercard, VISA, Check, or UPS COD \$2) accepted. Add \$7.50 for handling/shipping. CA residents add 6% sales tax.)



PICKLES & TROUT®
P.O. BOX 1206
GOLETA, CA 93116
(805) 685-4641

XENIX® Microsoft Corp.
CP/M® Digital Research, Inc.
TRSDOS™ Tandy Corp.

Program Listing 1. Rembrandt graphics editor.

```

5 CLEAR 500 'Model 4 users omit this line
10 IF GP=1 THEN X1=320:Y1=120:CR=10:LC=10:AR=.5:RA=5:PR$="GPRT3":C
A=10:PF=1:LF=1:LR=10:R=5:SI=10:SD=5:AP=.5:FF=1:PI=3.14159:SD=5:SI=
10:OIM G0(250):VIEW(0,0)-(639,239):DIM TS(17):GOSUB 1050 :GOSUB 22
00 :GOSUB 2400 :GET(0,0)-(0,0),G0:GOTO 170 :ELSE 2510
20 KE=PEEK(KP):IF KE AND 1 OR KE AND 128 OR KE AND 0 OR KE AND 16
OR KE AND 32 OR KE AND 64 THEN RETURN ELSE 20
30 SP=PI/SD:FOR A=0 TO PI/SP/2 STEP SP:SZ=SI*SIN(A)+.5:X=SZ*SIN(A)
+X1:Y=SZ/2*COS(A)+Y1:IF A=0 THEN 40 ELSE LINE(X0,Y0)-(X,Y),OO
40 X0=X:Y0=Y:NEXT:RETURN
50 LINE(X1,Y1)-(X2,Y2),OO:LINE-(X3,Y3),OO:LINE-(X1,Y1),OO:RETURN
60 XX=LR:CIRCLE(X1,Y1),R,OO,1.57,4.71,.8:CIRCLE(X1+XX,Y1),R,OO,4.7
1,1.57,.8:Z=R/1.25:LINE(X1,Y1+Z)-(X1+XX,Y1+Z),OO:LINE(X1,Y1-Z)-(X1
+XX,Y1-Z),OO:IF RL$="R" THEN CIRCLE(X1+XX,Y1),R,OO,1.57,4.71,.8:RE
TURN:ELSE CIRCLE(X1,Y1),R,OO,4.71,1.57,.8
70 LINE(X1,Y1)-(X1+XB,Y1),OO,,&RC003:LINE-(X1+XB,Y1+YB),OO,,&B0101
:LINE-(X1,Y1+YB),OO,,&RC003:LINE-(X1,Y1),OO,,&B0101:RETURN
80 CIRCLE(X1,Y1),R,OO,,.3:CIRCLE(X1,Y1+LR),R,OO,3.14,6.20,.3:LINE
(X1+R,Y1)-(X1+R,Y1+LR),OO:LINE(X1-R,Y1)-(X1-R,Y1+LR),OO:RETURN
90 CIRCLE(X1,Y1),R,OO,0,3.14,.3:CIRCLE(X1,Y1+LR),R,OO,,.3:LINE(X1
+R,Y1)-(X1+R,Y1+LR),OO:LINE(X1-R,Y1)-(X1-R,Y1+LR),OO:RETURN
100 IF KE AND 32 THEN X0=X0-CA
110 IF KE AND 64 THEN X0=X0+CA
120 IF KE AND 16 THEN Y0=Y0+INT(CA/2):IF CA=1 THEN Y0=Y0+1
130 IF KE AND 0 THEN Y0=Y0-INT(CA/2):IF CA=1 THEN Y0=Y0-1
140 RETURN
150 CZ=CR/1.25:LINE(X1,Y1)-(X1+LC,Y1+CZ),OO:LINE(X1,Y1)-(X1+LC,Y1-
CZ),OO:CIRCLE(X1+LC,Y1),CR,OO,ST,EN,.8:RETURN
160 LINE(X1,Y1)-(X1+CR,Y1+LC),OO:LINE(X1,Y1)-(X1-CR,Y1+LC),OO:CIRC
LE(X1,Y1+LC),CR,OO,ST,EN,.3:RETURN
170 X1=320:Y1=120
180 X1=X1+60:VIEW(0,0)-(639,239):PUT(X1,Y1),CU,XOR:FOR K=1 TO 50:N
EXT:IF BP=25 THEN 1770
190 GOSUB 20 :IF RE AND 120 THEN VIEW(0,0)-(639,239):GOSUB 2220
:FOR K=1 TO 20:NEXT:GOTO 330
200 IF KE AND 1 THEN GOSUB 2040 :GOTO 260
210 PUT(X1,Y1),CD,XOR:X0=X1:Y0=Y1:GOSUB 100 :X1=X0:Y1=Y0:IF X1<61
THEN X1=61
220 IF X1>620 THEN X1=620
230 IF Y1>219 THEN Y1=219
240 IF Y1<1 THEN Y1=1
250 PUT(X1,Y1),CU,XOR:GOTO 190
260 PUT(X1,Y1),CU,XOR:PUT(X1,Y1),PC,XOR
270 GOSUB 20
280 IF KE AND 128 THEN PUT(X1,Y1),PC,XOR:GOSUB 2000 :X1=X1-60:GOTO
100
290 IF KE AND 32 THEN PF=PF-1:IF PF<=0 THEN PF=1
300 IF KE AND 64 THEN PF=PF+1:IF PF>=17 THEN PF=17
310 IF KE AND 32 OR KE AND 64 THEN GOSUB 2040
320 GOTO 270
330 PUT(X1,Y1),CU,XOR:PUT(X1,Y1),IC,XOR
340 GOSUB 20
350 IF KE AND 120 THEN PUT(X1,Y1),IC,XOR:VIEW(71,1)-(630,219):FOR
R=1 TO 150:NEXT:X1=X1-60:GOTO 410
360 GOSUB 2160 :IF RE AND 32 THEN FF=FF-1:IF FF<=0 THEN FF=1 ELSE
IF FF+1=19 THEN FF=14
370 IF KE AND 64 THEN FF=FF+1:IF FF>=32 THEN FF=32 ELSE IF FF-1=14
THEN FF=19
380 IF KE AND 16 THEN FF=FF+2:IF FF>=32 THEN FF=32 ELSE IF FF-2=13
THEN FF=19 ELSE IF FF-2=14 THEN FF=20
390 IF KE AND 0 THEN FF=FF-2:IF FF<=0 THEN FF=1 ELSE IF FF+2=19 TH
EN FF=13 ELSE IF FF+2=20 THEN FF=14
400 GOSUB 2220 :GOTO 340
410 IF FF<>1 THEN 450 ELSE X2=X1:Y2=Y1:LINE(X1,Y1)-(X2,Y2)
420 GOSUB 20
430 IF KE AND 120 THEN X1=X2:Y1=Y2:X2=0:Y2=0:GOSUB 1000 :GOTO 100
440 LINE(X1,Y1)-(X2,Y2),0:X0=X2:Y0=Y2:GOSUB 100 :X2=X0:Y2=Y0:LINE
(X1,Y1)-(X2,Y2):GOTO 420
450 IF FF<>2 THEN 550
460 IF Y1>209 THEN Y1=209
470 IF X1>554 THEN X1=554
480 PUT(X1,Y1),E1,PSET:GOSUB 20 :PUT(X1,Y1),E2,PSET
490 IF KE AND 120 THEN 100
500 X0=X1:Y0=Y1:GOSUB 100 :X1=X0:Y1=Y0:IF Y1>209 THEN Y1=209
510 IF Y1<0 THEN Y1=0
520 IF X1<0 THEN X1=0
530 IF X1>554 THEN X1=554
540 GOTO 480
550 IF FF<>4 THEN 590 ELSE X2=X1:Y2=Y1:LINE(X1,Y1)-(X2,Y2),,B
560 GOSUB 20
570 IF KE AND 120 THEN 100
580 LINE(X1,Y1)-(X2,Y2),0,B:X0=X2:Y0=Y2:GOSUB 100 :X2=X0:Y2=Y0:LI
NE(X1,Y1)-(X2,Y2),1,B:GOTO 560

```

Listing 1 continued

Photo 5. Since your graphics data is in Basic, you can use these designs in other programs.

Epilogue

With a hi-res board installed, you can still run programs that use those miserable, chunky, block graphics characters. But once you discover how easy, fast, and versatile the hi-res board is, you won't want to go back.

Think of our program as a starting point. Let it inspire you. Tinker around with it or create your own high-resolution applications. Have fun. ■

Jtm Abbasian and Glen E. Sparks are writers and programmers. Both are members of the Dearborn, MI, TRS-80 User's Group. You can write them at 6168 Custer, S. Rockwood, MI 48179.

Related Articles

Graebner, Bruce A. and Jeffrey P., "Clear-Cut Trends," April 1985, p. 40. High-resolution line and bar graphs for the Models III, 4, 1000, and 2000.

Justice, Steve, "Fractals in Focus," May 1985, p. 58. High-resolution geometric fractals for the Models III, 4, 1000, and 2000.

Listing 1 Continued

```

590 IF FF<>5 THEN 670 ELSE RA=10:CIRCLE(X1,Y1),RA,,,AR
600 GOSUB 20
610 IF KE AND 120 THEN 100
620 CIRCLE(X1,Y1),RA,0,,,AR:IF KE AND 32 THEN RA=RA-10: IF RA<0 THEN RA=0
630 IF KE AND 64 THEN RA=RA+10
640 IF KE AND 16 THEN AR=AR+.05:IF AR>.5 THEN AR=AR+.05:IF AR>1.5 THEN AR=AR+1:IF AR>40 THEN AR=40
650 IF KE AND 8 THEN AR=AR-.05:IF AR<-3.72529E-08 THEN AR=-3.72529E-08:ELSE IF AR>.5 THEN AR=AR-.05:IF AR>1.5 THEN AR=AR-1
660 CIRCLE(X1,Y1),RA,,,AR:GOTO 600
670 IF FF<>6 THEN 730 ELSE OO=1:GOSUB 30
680 GOSUB 20
690 IF KE AND 120 THEN 100
700 OO=0:GOSUB 30 :X0=SI:GOSUB 100 :SI=X0:IF KE AND 16 THEN SD=SD-1:IF SD<=2 THEN SD=2
710 IF KE AND 8 THEN SD=SD+1:IF SD>=14 THEN SD=14
720 OO=1:GOSUB 30 :GOTO 600
730 IF FF<>3 THEN 070 ELSE X2=X1:X3=X1:Y2=Y1:Y3=Y1
740 GOSUB 20
750 IF KE AND 120 THEN 100
760 IF KE AND 1 THEN 860
770 OO=0:GOSUB 50
780 X0=X1:Y0=Y1:GOSUB 100 :X1=X0:Y1=Y0
790 OO=1:GOSUB 50 :GOTO 740
800 OO=0:GOSUB 50
810 GOSUB 20
820 IF KE AND 120 THEN 100
830 IF KE AND 1 THEN 790
840 OO=0:GOSUB 50
850 X0=X3:Y0=Y3:GOSUB 100 :X3=X0:Y3=Y0
860 OO=1:GOSUB 50 :GOTO 810
870 IF FF<>7 THEN 920 ELSE OO=1:ST=0:EN=6.20:GOSUB 160
880 GOSUB 20
890 IF KE AND 120 THEN 100
900 OO=0:ST=0:EN=6.20:GOSUB 160 :X0=CR:Y0=LC:GOSUB 100 :LC=Y0:CR=X0:IF CR<1 THEN CR=1

```

Listing 1 continued on p. 108

Circle 126 on Reader Service card.

ANNOUNCING: By far the most powerful BULLETIN BOARD SYSTEM for TRS-80 Models I, III and 4(III). "The French Connection" by Phil French **TFC** FEATURES:

- You can select either an "open access" or a secure private-password system.
- Separate private mail and general bulletin sections.
- Easy to use but advanced "layered menu" system, with an "expert mode" also.
- An Information Section including a modifiable Information Directory, and the ability to remotely edit or create information files.
- Special user privileges may be individually assigned, from Upload/Download access to remote sysop status.
- Features of the system can be tailored to each individual user, such as screen width for word wrap, linefeed enable/disable, upload prompts, special characters, and more.
- Plus endless other goodies such as free-format text entry, also all the regular stuff like upload/download, mail read/scan options, caller log, and lots, lots, more.
- TFC is written in 100% Z-80 assembly language for efficiency and security.

INTRODUCTORY OFFER \$99.50

Bulletin Boards Systems are popping up all over these days for special groups, commercial use, or just general access. All you need to run one off your own computer is a modem and the right software, and that's where TFC comes in. There are many other BBS programs available for the TRS-80, but once you check out the features of TFC you'll see that there is really no comparison. Many of the features TFC assumes to be essential are either "special features" or non-existent on other systems. Such as TFC's "free format text entry", which allows text input without an [ENTER] after each screen line, unlike many other systems. TFC will then format and word-wrap the display to any screen width from 32 to 80 characters. As well, TFC has personal "mailboxes", completely separate from the general bulleting file. Even if you already run a BBS system, you should look into the advanced features that TFC can provide. After all, when you can get the best why settle for anything less.

AVAILABLE FROM:

JMG SOFTWARE INTERNATIONAL

VOICE: (416) 575-2867
Computer: (416) 575-0515
3235 Lockport Road
Niagara Falls, NY 14305

FINE PRINT:

Visa, MasterCard, check, M.O. and COD accepted.
Shipping in the U.S. and Canada is FREE.
COD orders add \$2.50 for COD charges.
Special shipping and Overseas orders are charged actual shipping costs.

Now you and your TRS-80 can team up for **HASSLE-FREE PROGRAMMING** with **LOAD 80**

**UTILITIES
TUTORIALS, HOME &
HOBBY APPLICATIONS**

It's true

More TRS-80* pleasure and fewer programming headaches can be yours all year with **Load 80**.

Load 80 comes in your choice of cassette or disk, and is filled with more than a dozen "ready to run" programs listed in **80 Micro**.

It's ready

"Ready to run" means the hard work has been done ahead of time! All you do is load and enjoy. No keyboarding hassles. No debugging.

Every *Load 80* features the high-quality tutorials, utilities, games, and word-processing programs you've come to expect from *80 Micro*. It has everything you need for enjoyable, practical, easy TRS-80 computing.

A subscription to *Load 80* is more than just a wise purchase. It's an investment! You'll be building your software library for a fraction of the cost of comparable programs sold in retail stores!

FREE assistance

Should you need assistance, the technical editors at *Load 80* and *80 Micro* will be ready to lend a hand. Hassle-free programming for you and your TRS-80 can begin right now with a year's subscription to *Load 80*. Simply return the postage-paid order card next to this ad, or call **TOLL FREE 1-800-258-5473**. In NH, dial 1-924-9471.

* TRS-80 is a registered trademark of Radio Shack, a division of Tandy Corp.

Yes! Save me time and money with **LOAD 80.** Send me:

- ☐ 1 year of **LOAD 80** on disk for \$199.97
- ☐ 1 year of **LOAD 80** on cassette for \$99.97
- ☐ This month's **LOAD 80** disk for \$21.47
- ☐ This month's **LOAD 80** on cassette for only \$11.47

Prices include postage and handling. Foreign airmail please add \$1.90 per item or \$25.00 per subscription. U.S. funds drawn on U.S. banks only

☐ Check/MO ☐ MC ☐ Visa ☐ AE

L8509

Card # _____ Exp. Date _____

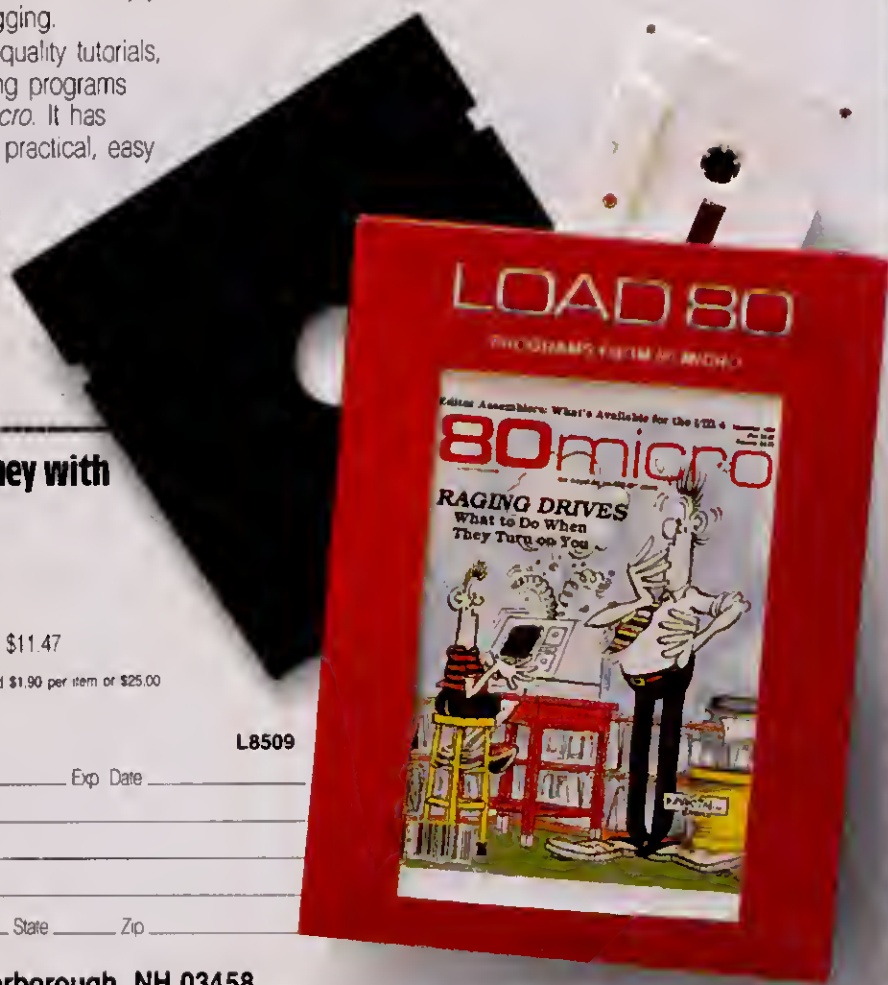
Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Load 80 • 80 Pine Street • Peterborough, NH 03458



H & E COMPUTRONICS INC.

• • • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ • • •

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • * ATARI is a trademark of Atari Inc. • * APPLE is a trademark of Apple Corp. • * PET is a trademark of Commodore • * CP/M is a trademark of Digital Research • * XEROX is a trademark of Xerox Corp. • * IBM is a trademark of IBM Corp. • * OSBORNE is a trademark of Osborne Corp.



BUSINESS PAC 100

100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours
★ 30-Day money back guarantee

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....

Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....

Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

NAME	DESCRIPTION		
1 RULE78	Interest Apportionment by Rule of the 78's	59 WACC	Weighted average cost of capital
2 ANNU1	Annuity computation program	60 COMBAL	True rate on loan with compensating bal. required
3 DATE	Time between dates	61 DISCBAL	True rate on discounted loan
4 DAYYEAR	Day of year a particular date falls on	62 MERGAMAL	Merger analysis computations
5 LEASEINT	Interest rate on lease	63 FINRAT	Financial ratios for a firm
6 BREAKVEN	Break-even analysis	64 NPV	Net present value of project
7 DEPRSL	Straightline depreciation	65 PRINDLAS	Laspeyres price index
8 DEPRSY	Sum of the digits depreciation	66 PRINDPA	Paasche price index
9 DEPRD8	Declining balance depreciation	67 SEASIND	Constructs seasonal quantity indices for company
10 DEPRDD8	Double declining balance depreciation	68 TIMETR	Time series analysis linear trend
11 TAXDEP	Cash flow vs. depreciation tables	69 TIMEMOV	Time series analysis moving average trend
12 CHECK2	Prints NEBS checks along with daily register	70 FUPRINF	Future price estimation with inflation
13 CHECKBK1	Checkbook maintenance program	71 MAILPAC	Mailing list system
14 MORTGAGE/A	Mortgage amortization table	72 LETWRT	Letter writing system-links with MAILPAC
15 MULTMON	Computes time needed for money to double, triple, etc.	73 SORT3	Sorts list of names
16 SALVAGE	Determines salvage value of an investment	74 LABEL1	Shipping label maker
17 RRVARIN	Rate of return on investment with variable inflows	75 LABEL2	Name label maker
18 RRCONST	Rate of return on investment with constant inflows	76 BUSBUD	DOME business bookkeeping system
19 EFFECT	Effective interest rate of a loan	77 TIMECLCK	Computes weeks total hours from timeclock info.
20 FVAL	Future value of an investment (compound interest)	78 ACCTPAY	In memory accounts payable system-storage permitted
21 PVAL	Present value of a future amount	79 INVOICE	Generate invoice on screen and print on printer
22 LOANPAY	Amount of payment on a loan	80 INVENT2	In memory inventory control system
23 REGWITH	Equal withdrawals from investment to leave 0 over	81 TELDIR	Computerized telephone directory
24 SIMPOISK	Simple discount analysis	82 TIMJAN	Time use analysis
25 DATEVAL	Equivalent & nonequivalent dated values for oblig.	83 ASSIGN	Use of assignment algorithm for optimal job assign.
26 ANNUDEF	Present value of deferred annuities	84 ACCTREC	In memory accounts receivable system-storage ok
27 MARKUP	% Markup analysis for items	85 TERMSPAY	Compares 3 methods of repayment of loans
28 SINKFUND	Sinking fund amortization program	86 PAYNET	Computes gross pay required for given net
29 BONDVAL	Value of a bond	87 SELLPR	Computes selling price for given after tax amount
30 DEPLETE	Depletion analysis	88 ARBCOMP	Arbitrage computations
31 BLACKSH	Black Scholes options analysis	89 DEPRSF	Sinking fund depreciation
32 STOCVAL1	Expected return on stock via discounts dividends	90 UPSZONE	Finds UPS zones from zip code
33 WARVAL	Value of a warrant	91 ENVELOPE	Types envelope including return address
34 BONDVAL2	Value of a bond	92 AUTOEXP	Automobile expense analysis
35 EPSEST	Estimate of future earnings per share for company	93 INSFILE	Insurance policy file
36 BETAALPH	Computes alpha and beta variables for stock	94 PAYROLL2	In memory payroll system
37 SHARPE1	Portfolio selection model-i.e. what stocks to hold	95 DILANAL	Dilution analysis
38 OPTWRITE	Option writing computations	96 LOANAFD	Loan amount a borrower can afford
39 RTVAL	Value of a right	97 RENTPRCH	Purchase price for rental property
40 EXPVAL	Expected value analysis	98 SALELEAS	Sale-leaseback analysis
41 BAYES	Bayesian decisions	99 RRCONVBD	Investor's rate of return on convertible bond
42 VALPRINF	Value of perfect information	100 PORTVAL9	Stock market portfolio storage-valuation program
43 VALADINF	Value of additional information		
44 UTILITY	Derives utility function		
45 SIMPLEX	Linear programming solution by simplex method		
46 TRANS	Transportation method for linear programming		
47 EOQ	Economic order quantity inventory model		
48 QUEUE1	Single server queueing (waiting line) model		
49 CVP	Cost-volume-profit analysis		
50 CONDPFOT	Conditional profit tables		
51 OPTLOSS	Opportunity loss tables		
52 FQOQOQ	Fixed quantity economic order quantity model		
53 FQEQWSH	As above but with shortages permitted		
54 FQEQQPB	As above but with quantity price breaks		
55 QUEUECB	Cost-benefit waiting line analysis		
56 NCFANAL	Net cash-flow analysis for simple investment		
57 PROFIND	Profitability index of a project		
58 CAP1	Cap. Asset Pr. Model analysis of project		

- ☐ TRS-80 Cassette Version \$99.95
☐ TRS-80 (Mod-I or III), Pet, Apple or Atari Versions \$99.95
☐ TRS-80 Mod-II, IBM, Osborne and CP/M Versions \$149.95

ADD \$3.00 FOR SHIPPING IN UPS AREAS
 ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
 ADD \$5.00 TO CANADA AND MEXICO
 ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

COMPUTRONICS
 MATHEMATICAL APPLICATIONS SYSTEMS

50 N. PASCACK ROAD
 SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG

DEALER INQUIRIES INVITED

NEW TOLL-FREE ORDER LINE
 (OUTSIDE OF N.Y. STATE)
 (800) 431-2818

AMERICAN EXPRESS

VISA

24 HOUR ORDER LINE

(914) 425-1535



ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
 DELIVERY SUBJECT TO AVAILABILITY



A Basic Programmer's Best Friend

Editor's note: The size of this cross-reference program prohibits 80 Micro from publishing it as a source code listing. However, because the program is one we feel is of widespread utility, we have published it as a space-saving data statements listing. If you'd rather not type in data statements, the /CMD program and source code, as well as this Basic program, are available on Load 80 (see p. 64 for ordering information).

Crosscheck saves you debugging time and frustration by automatically cross-referencing Basic key words, variables, and GOSUB, GOTO, and Restore statements by line number.

No one likes to debug long Basic programs. In programs with a lot of variables, you can wear yourself out trying to find that one A# that should be A%, or the Print statement that should be LPRINT.

Although cross-reference utilities have been around since the days of the Model I, none has been available for TRSDOS 6.X until now.

Crosscheck loads Model 4 Basic programs from disk and cross-references them by line numbers in GOSUB, GOTO,

and Restore statements, by Basic key words, by variables, or by any combination of the three (see the Program Listing). The program displays the results on-screen and prints them out in 80- or 132-column format.

Armed with a Crosscheck printout, you can go directly to program lines that include a referenced line number to check for errors or to ensure that an item isn't in any lines where it doesn't belong.

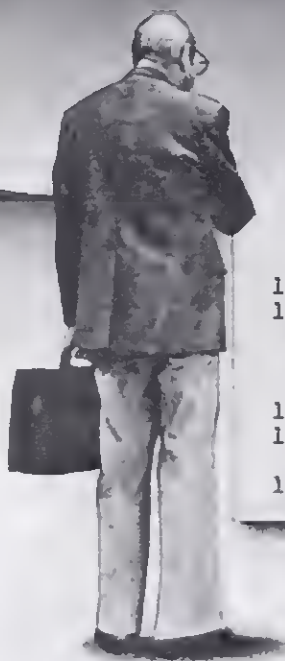
Basic File Formats

Before examining how Crosscheck works, you should understand Model 4 Basic's file format. The first byte of a Model 4 Basic disk file indicates whether you stored your Basic code in compressed (FF hexadecimal [hex]), ASCII (30-39 hex), or protected (FE hex) format. The standard Save command stores Basic programs in compressed format, the one Crosscheck reads.

In compressed format, all Basic programs start at a fixed point in memory. Each program line starts with the 2-byte memory address of the next line in least-significant byte/most-significant byte (LSB/MSB) format (see Fig. 1).

The program's current line number comes next, as a 2-byte integer in LSB/MSB format, followed by the rest of the line's code. The line then ends with a 00 byte, indicating that the next 2 bytes, those that start the next line, identify the memory address for the following line.

This cycle repeats until Basic retrieves a 2-byte address of 00 00. Hex listings of Basic programs always end with 00 00 00, one 00 byte ending the final line, and 00



620	42.	640
720	640	740
820	740	840
920	840	1080
1160	1080	1180
1260	1180	1500
400	1500	540
140	540	
40	380	
1060	1320	
1580	1580	
120		
1480		
420	420	

INKE-
INPUT
LEFTS
LOF
LSET
MKSS
NEXT
ON
OPEN
OR
PRINT

2.
850
450
620
630
910
200
300
240



Cross-Reference for CH...

Line Numbers	reference
360 =>	420 940
440 =>	420 580
960 =>	560 780
1300 =>	760 110
	1080

BASIC Keywords re...

1440
1480
760
860
1460
1440
80
580
640
72
71
8

00 representing the address of the next (nonexistent) line.

Model 4 Basic's Line Numbers and Constants

Model 4 Basic stores line numbers and constants in a format different from Model I/III Basic, which leaves line numbers and numeric constants in ASCII format. Model 4 Basic saves line numbers in hex as 2-byte integers in LSB/MSB format and it compresses numeric constants using special codes (see Table 1). It stores integers 0-9 as single bytes in the range 11-1A hex, integers 10-255 with an indicator (token) byte of 0F hex followed by the 1-byte hex number, and integers between 256 and 32,767 with a token byte of 1C hex followed by 2 bytes in LSB/MSB format.

In Model 4 Basic, all single-precision numbers appear as a token byte of 1D hex followed by 4 hex bytes. All double-precision numbers have a token byte of 1F hex followed by 8 hex bytes.

To Basic, negative numbers don't exist. It treats minus signs as separate entities from their associated numbers. This principle, known as unary minus, means that Basic handles any negative number as a positive number that it subtracts from zero. For example, Basic represents -5 as 0-5. It leaves the minus sign encoded as F4 hex, which is also the compression (token) code for subtraction.

Key Words

Some Model 4 Basic key word token codes are 2 bytes long. They consist of an FF hex byte followed by one of the standard 1-byte token codes. The Model 4/4P

Disk System Owner's Manual provides an alphabetic list of these tokens (in decimal) by key word (see the table, "Internal Codes for Basic Keywords," p. A-80).

Variables

Model 4 Basic allows variables of up to 40 characters. However, as variable names get longer, Basic execution slows down because of the increased character testing required to verify the variable.

While Model I/III Basic lets you tack the type declaration characters (% , # , ! , or \$) to the end of a variable, Model 4 Basic treats them as part of the variable. The same holds true for array variables; the left parenthesis is part of the 40-character limit.

An Example

Figure 1 shows a Basic program and its equivalent hex listing. The first byte in the hex listing (FF hex) represents the standard compressed Basic file. The next 2 bytes (17 7F) tell Basic that the second program line starts at memory location 7F17 hex, and the 0A 00 bytes that follow show the line number as 10.

The main portion of the line begins with the variable X (58), a space (20), the token code for the equals sign (F1), another space (20), and the number 5 (16, one of the special 1-byte integers). The 00 byte signals the end of the first line.

Basic then looks for a new line address (1F 7F). This is followed by the 2 bytes for the line number 20 (14 00), the token code for the Print command (91), a space (20), the variable X (58), and the 00 byte that ends the line.

Line 30 shows an integer value of 100 in the compressed form of 0F 64, and line 40 provides a line number reference to line 20, compressed as 0E 14 00.

In line 50, the byte sequence 1D 00 00 5C 85 represents the single-precision number 27.5. The 1D byte tells Basic that the next 4 bytes are special cases. Without this byte, Basic could interpret the 00 byte as an end-of-line indicator and scramble the rest of the program.

The 00 00 00 bytes at the end of the hex listing signal the end of the program.

About Crosscheck

Type in and run the Listing. It includes a form of error-checking known as a checksum. When you run the program, it adds the numbers in each line and checks the total against a predetermined sum for that line. If the numbers fail to match, the program displays a message telling you in which line the errors occur and the program stops executing. Carefully check the data line and the checksum total and correct the error.

Run the program again. When you have all the data statements correct, lines 180-

LOAD
80

System Requirements

Model 4/4P
64K RAM
TRSDOS 6.X
Disk Basic
Printer optional

From Computer Plus to YOU...

PLUS after PLUS after PLUS



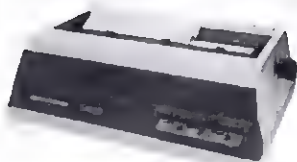
Tandy 200 24K \$739
Model 100 24K \$510



Tandy 1200 HD \$1599
10 Meg. 256K



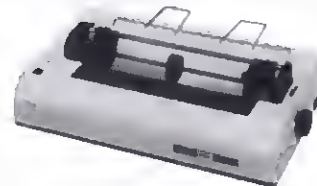
Tandy 1000 \$779
Tandy 1000 HD \$1539



Smith Corona L-1000
\$259



Color Computer II
w/16K Ext. Basic \$179



DMP105 \$160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 1 Drive 128K	779.00
Tandy 1000 HD 10 Meg. 256K	1539.00
Tandy 1200 10 Meg. 256K	1599.00
Tandy 2000 2 Drive 256K	1295.00
Tandy 2000 10 Meg. 256K	2025.00
Model IV Desktop 64K	959.00

PRINTERS

Radio Shack DMP-2100P	1159.00
Radio Shack DMP-430	660.00
Radio Shack DWP-220 Daisy Wheel	469.00
Radio Shack TRP-100 Portable	229.00
Silver Reed EXP-550 Daisy Wheel	430.00
Star SG-10	245.00
Star SG-15	410.00
Star SD-10	365.00
Panasonic P-1091	275.00
Toshiba 351	1325.00
CITOH Prowriter BS10AP + NLQ	345.00
Okidata 192	379.00
Okidata 193	539.00
Epson LX-80	245.00
Epson FX-80	359.00

Tandy 1000/1200 ACCESSORIES

Tandy 1000 Disk Drive Kit	159.00
Tandy 1000 10 Meg. Hard Drive	579.00
Hard Drive Controller Board	265.00
256K Ram Board (inc. 128K & DMA)	199.00
512K Ram Board (includes 128K)	169.00
256K Memory Plus Expansion Brd.	249.00
PBJ Multi-Function Board (128K)	269.00
PBJ Multi-Function Board (256K)	299.00
PBJ Multi-Function Board (512K)	349.00
128K Ram Upgrade Kit (Tandy)	115.00
128K Ram Upgrade Kit (NEC)	78.00
256K Ram Upgrade (for PBJ Board)	169.00
300 Baud Modem Board	129.00
RS-232 Serial Board	89.00
Digi-Mouse/Clock Board	89.00

Tandy 1000/1200 MONITORS

Tandy VM-2 Green Monitor	129.00
Tandy CM-2 RGB Color Monitor	379.00
Tandy VM-3 TTL Green Monitor	179.00
Taxan 122 TTL Amber Monitor	139.00
Tandy 1200 Text Monitor Adapt.	179.00
Tandy 1200 Color/Graphics Adapt.	240.00

MODEMS

Radio Shack DCM-3 Model	52.00
Radio Shack DC Modem II	160.00
Radio Shack DC Modem 2212	315.00
Hayes Smartmodem II 300 Baud	215.00
Hayes Smartmodem 1200 Baud	429.00
Novation J-Cat 300 Baud	115.00

FOR EVERYONE

Network Four Outlet Surge Prot.	69.95
CCR-81 Cassette Recorder	52.00
CCR-82 Cassette Recorder	43.00
C-20 Digital Cassette Tapes (10pk)	9.95
Verbatim SSDD Plastic Box (10pk)	24.95
Verbatim DDDO Plastic Box (10pk)	29.95
Generic SSDD Diskettes (10pk)	17.95
NEC 64K Ram Chips (set of 8)	49.00
Radio Shack 16K Ram Chips (8)	25.00
Locking Disk Box (holds 70)	19.95
Flip N File Disk 50	15.00
Fantold CleanEdge Paper (2600)	35.00

Radio Shack software 10% off.
Send for complete listing of
brand name software and hardware.

CALL TOLL FREE
1-800-343-8124

- LOWEST POSSIBLE PRICES
- BEST POSSIBLE WARRANTY
- KNOWLEDGEABLE SALES STAFF
- TIMELY DELIVERY
- SHOPPING CONVENIENCE



computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460 **SINCE 1973**

IN MASSACHUSETTS CALL (617) 486-3193

```

10 X = 5
20 PRINT X
30 X = X + 100
40 IF X < 1000 THEN 20
50 X = 300 + 27.5
60 PRINT X
70 END

```

```

FF 17 7F 0A 00 58 20 F1 20 16 00 1F 7F 14 00 91 .....X.....
20 58 00 2E 7F 1E 00 58 20 F1 20 58 20 F3 20 0F X.....X . X..
64 00 42 7F 28 00 8B 20 58 20 F2 20 1C E8 03 20 d.B.(. X ....
D0 20 0E 14 00 00 56 7F 32 00 58 20 F1 20 1C 2C .....V. 2.X...
01 20 F3 20 1D 00 00 5C 85 00 5E 7F 3C 00 01 20 .....^.<..
58 00 64 7F 46 00 81 00 00 00 X.d.F...

```

Figure 1. Sample Basic program in compressed form.

Line numbers referenced: 20 = > 40

Basic key words referenced:

```

+      30 50
<      40
=      10 30 50
END    70
IF     40
PRINT 20 60
THEN  40

```

Basic variables referenced: X 10 20 30 40 50 60

Figure 2. The program in Fig. 1 cross-referenced by line numbers, key words, and variables.

Special 1-byte integers in Model 4 Basic:

Number	Hex byte in file	Number	Hex byte in file
0	11	5	16
1	12	6	17
2	13	7	18
3	14	8	19
4	15	9	1A

Other numeric representations used:

Number	Hex Byte	Followed by
Integers from 10-255	0F	1 byte
Integers from 256-32767	1C	2 bytes *
All single-precision numbers	1D	4 bytes *
All double-precision numbers	1F	8 bytes *

* Basic stores these numbers in the form shown on p. 2-171 of the *Model 4/4P Disk System Owner's Manual*.

Table 1. Model 4 Basic codes for numeric constants.

Parameter	Description
LINES	Cross-reference line numbers
KEYWDS	Cross-reference key words
VAR	Cross-reference variables
PRT	Print cross-reference
WIDE	Print cross-reference in 132-column format

Table 2. Crosscheck parameters.

FOR TRS-80 MODELS 1, 3, 4, 4P
IBM PC/XT, AT&T 6300, ETC.

THE COMPLETE FORTH GETS A MAJOR UPDATE: MMSFORTH V2.4

- A total software environment: custom drivers for printer, video and keyboard improve speed and flexibility. (New TRS-80 M.4 version, too!)
- Common SYS format gives you a big 395K (195K single-sided) per disk, plus a boot track!
- Common wordset (79-Standard plus MMSFORTH extensions) on all supported computers.
- Common and powerful applications programs available (most with MMSFORTH source code) so you can use them compatibly (with the same data disks) across all supported computers.
- Very fast compile speeds and advanced program development environment.
- A fantastic full-screen Forth Editor: Auto-Find (or -Replace) any word (forward or back), compare or Pairs-Edit any two ranges of blocks, much more.
- Temporary dictionary areas.
- QUANS, VECTs, vectored I/O, and many more of the latest high-performance Forth constructs.
- Manual and demo programs are bigger and better than ever!
- Same thorough support: Users Newsletter, User Groups worldwide, telephone tips. Full consulting services.
- Personal Licensing (one person on one computer) is standard. Corporate Site Licensing and Bulk Distribution Licensing available to professional users.

mmsFORTH

IT'S BETTER THAN EVER.

The total software environment for IBM PC/XT, TRS-80 Model 1, 3, 4 and close friends.

- Personal License (required):
MMSFORTH V2.4 System Disk \$179.95
(TRS-80 Model 1 requires lowercase, DDEN, 1.40-track drive)
- Personal License (additional modules):
FORTHCOM communications module \$ 49.95
UTILITIES 49.95
GAMES 39.95
EXPERT-2 expert system 69.95
DATAHANDLER 59.95
DATAHANDLER-PLUS (PC only, 128K req.) . . 99.95
FORTHWRITE word processor 99.95
- Corporate Site License
Extensions from \$1,000
- Bulk Distribution from \$500/50 units.
- Some recommended Forth books:
STARTING FORTH (programming) 19.95
THINKING FORTH (technique) 15.95
BEGINNING FORTH (re MMSFORTH) 16.95

Shipping/handling & tax extra. No returns on software. Ask your dealer to show you the world of MMSFORTH, or request our free brochure.

MILLER MICROCOMPUTER SERVICES
61 Lake Shore Road, Natick, MA 01760
(617) 653-6136

LETTER - WRITER™
 "Integrated WORD PROCESSING Power"

BEST BUY

THE "BEST" SOFTWARE IS GUARANTEED! TRY IT and LIKE IT, or GET a REFUND

The machine code disk L-W is "A" rated by Allenbach's "SOFTWARE REPORTS" for: **EASY USE, DOCUMENTATION, FEATURES**

- FORM LETTERS and LABELS on any printer.
- ADD end SUB bookkeeping and tax columns.
- LEGAL PAPER LINE NUMBERING, Centering.
- Copy, move, delete, insert, merge, select.
- Screen display same as printout, unmodified M1 users can see and print up/lower case.
- MASS MAILER, graphics, cancel changes.
- SPLIT SCREEN typing line, see old and new versions, word wrap, disk warm start.
- Over 50 "one key" INSERTION PHRASES.
- ONE MODE: Type / Edit / Delete without switching modes - NO TRAINING PERIOD.

WE PAY TAX and USA SHIPPING. Try your L-W for 3 months. Like it or return it for a refund, less our shipping costs of: \$3.50.

Models I, III / IV: TAPE 10B \$ 37.99
 DISK 32K (*Extra Features) \$ 47.99

10 Verbatim 5.25/DD \$ 18.99, 5.25/DD \$ 23.99
 30 Microcette C-10 tapes and boxes \$ 13.95

ASTRO-STAR ENTERPRISES
 5905 Stone Hill Dr. Information/orders:
 Rocklin, CA 95077 (916) 624-3708

Orders: 1-800-822-8870
 In IL 1-800-943-7317

Circle 249 on Reader Service card.

Type fast!



Hunt and peck is fine for chickens but you can **FasType™**.

- **FasType™** is the fun and easy way to learn to type.
- **FasType™** teaches the TRS-80 III/4/4P keyboard.
- **FasType™** is machine language fast.
- **FasType™** is teacher written, classroom proven.
- **FasType™** for Tandy 1000, August 1, 1985.

\$39.95/disk plus \$1.50 shipping. Arizona residents add 5%. Specify model. Schools ask about our network version.

FasType™



Press A Software
 Box 364
 Jerome, AZ 86331
 602-634-2688

220 will write the program file BASREF/CMD.

Data lines 540-3030 contain Crosscheck's object code in decimal format. Data lines 270-510 contain checksum totals.

Line 40 dimensions the checksum array, and line 50 reads the checksum data into the array. Lines 70-150 is a routine to read each number in a data line (from lines 540-3030) and add it to a total.

Using Crosscheck

To run Crosscheck, at DOS Ready, type in BASREF followed by the name of the compressed Basic file you want to cross-reference and the cross-reference parameters in parentheses (see Table 2 for a list of parameters). The parameters tell Crosscheck to reference a program by line numbers, key words, or variables, and let you select the printout option.

Crosscheck automatically invokes any parameter you omit in parentheses (except printer parameters) unless you specify otherwise. For example, the command BASREF APS/BAS (LINES=NO,KEYWDS,VAR,PRT,WIDE) tells Crosscheck to cross-reference the program APS/BAS by key words and variables, but not by line numbers, and to copy the display to the printer in 132-column format. You can abbreviate parameters to their first letter.

Crosscheck temporarily saves the position of the file name you typed in while it displays the banner message, enables the break key, and clears any detected break or shift-@ entries. It then restores the file name and copies it to the file control block (FCB) using the @FSPEC supervisor call. This call also checks for a valid file name and converts lowercase letters to uppercase.

If Crosscheck identifies an invalid file name, it exits to TRSDOS Ready. It tests the parameters (if any) for proper syntax. A parameter error forces an error message and aborts the program to TRSDOS Ready.

It also tests the special parameter entry of an equals sign with nothing after it. For example, Crosscheck considers KEYWDS = the same as KEYWDS = DFF.

After Crosscheck tests and validates all parameters, it rechecks the printer parameter. If you aren't using a printer, Crosscheck ignores the wide parameter.

If you're using the printer with the wide display, Crosscheck modifies three display buffer measurements to function at the longer length.

The program then opens the file and checks the first hex byte for FF hex. If the open file creates an error, or if the first byte isn't FF, Crosscheck displays an error message and exits to TRSDOS Ready.

Once Crosscheck opens and tests the file, it stores the top of available memory and displays a "Loading file" message. The program reads and discards the two address bytes, then loads the line number to the storage buffer.

As each program byte loads, Crosscheck compares the top of the buffer to the top of available memory. If Crosscheck reaches the top before it finishes loading the program, it displays an error message and returns to DOS.

After collecting the line number in the buffer, Crosscheck continues reading bytes to the buffer until it finds a 00 hex byte. It then reads and discards the 2 address bytes that follow it, and continues if the bytes aren't 00 00.

Crosscheck deletes bytes between quotation marks (and the quotation marks themselves) after a Print statement, and deletes bytes after a Remark statement (REM or *) or a data statement to the 00 (end-of-line) byte.

Crosscheck ignores bytes for special numeric constant tokens and the associated bytes that follow. An OE hex byte signals a line number reference, so Crosscheck loads the next 2 bytes to the buffer. This prevents Crosscheck from misreading an embedded 00 byte as the end of the line.

When the program has loaded the file and the last address bytes are 00 00, Crosscheck loads an FF FF byte pair to the buffer as the final line number (no valid Basic line number is that large).

To restore the file name, Crosscheck closes the file. This lets the program use the FCB as the end of the display line. The program then skips a few lines and is ready to scan.

Referencing Line Numbers

Crosscheck tests its parameter flag bytes to see if it must look at program line numbers. If not, Crosscheck skips to the key word scan.

If Crosscheck is examining line numbers, it loads the first line number to the HL register. The program eventually loads it in ASCII decimal form to the beginning of the display line through the @HEXDEC supervisor call.

Crosscheck then checks the file for OE bytes (signaling line number references), and compares them to the line number in HL. When the values match, Crosscheck transfers the line number holding the reference to the display buffer.

This process continues until Crosscheck has scanned the whole program once. It then loads HL with FFFF at the end of the buffer. At that point, Crosscheck has found all references.

A subroutine loads each reference as requested to the first available space in the display line (every seven spaces). After each addition, the subroutine tests the display line for a full condition and returns if it has room for another entry.

When the line is full, the program sends it to another macro for handling. The routine then erases the line and resets it to an empty state for more references.

When the routine receives the FFFF bytes, it displays any partial line of references, or returns if the line is empty.

After the program logs a valid reference to the display line, it replaces the OE byte with a 01 byte in the buffer. After the program tests all valid references (all references to existing line numbers), it makes an additional pass to look for remaining OE bytes and reports references to any line numbers that don't exist. It displays these as the line number of the line containing the bad reference, followed by the bad line number.

One exception to watch for is any reference to a line zero, usually a line such as ON ERROR GOTO 0. Since this valid line resets the error trap in a program, no line zero exists in the actual program to match, and it appears as a false error.

However, this permits quick location of error-trap routines. Since most programs contain few error-checking routines, Crosscheck prints them one reference per line. Once Crosscheck completes the pass, it looks at key word references.

Referencing Key Words

As with the line number references, Crosscheck tests to determine whether you requested a cross-reference of Basic key words. If you haven't, the program skips to the variables scan. Otherwise, the HL register points to a table of key words and token codes.

The key word table is alphabetical to force the scan and the listing into alphabetical order. Crosscheck uses the IX register as it scans the buffer for bytes with the high-order bit set (the sign of a key word token).

As Crosscheck finds each new token in the key word table, it loads the code in the BC register. B is 00 or FF hex (depending on whether the token is normal or extended), and C contains the other token byte. The program then loads the key word to the display line and begins scanning line numbers for a token match.

Referencing Variables

Crosscheck then scans the Basic program for variables references. This is the most complex part of the program, since Crosscheck must keep the variables in alphabetical order without building them into a new table and sorting.

The solution is to use multiple scans, which are sufficiently fast in machine language. First the program searches the buffer for the first character in the range A-Z (the only legal characters for the beginning of a variable).

Crosscheck compares these to the character in the first position of the temporary holding area for the variable. If the new first character found is less, the entire new variable replaces the one in the temporary holding area.

Scanning for valid characters ends when Crosscheck finds an invalid character or a left parenthesis such as V(X). If the new variable found is shorter in length than the one in the temporary holding

area, Crosscheck fills the remainder of the area with FF bytes to ensure sorting the shortest one first.

If the first character is equal in value, Crosscheck compares each following character to the same relative character in the temporary holding area until it finds an invalid character or a character of lower value.

When Crosscheck has completed one pass through the buffer, the temporary holding area contains the variable lowest in sorting order. The program displays the variable on a line and sets the IX register back to the start of the buffer to scan for the variable.

After the program sends each line number with a reference to the display line, it zaps the variable with 01 bytes. The next scan for a variable finds only the next lowest variable each time it goes through the buffer.

This process continues until the search pass finds no valid variables. Crosscheck then displays a message indicating the end of the cross-reference, sends a form-feed character to the printer (if used), and exits to TRSDOS Ready.

Random Notes

Some parts of the program call a pause routine to detect shift-@ or break characters.

If you press the break key or if an error occurs, Crosscheck loads the HL register with nonzero values before exiting to DOS. TRSDOS 6.X lets you use a nonzero HL to abort any active job control language (JCL) file, if a JCL file calls Crosscheck.

Also, Crosscheck single-spaces all cross-references by line number and key word to save paper. You can find each new reference list by looking for an entry in the left-most column in the display.

Crosscheck gives you a powerful utility that quickly runs a full cross-reference on most TRSDOS 6.X Basic programs. Crosscheck also prints a list for debugging or documenting your programs. A cross-reference run for the sample program in Fig. 1 appears in Fig. 2.

Lastly, don't be concerned if you see that your variables listing suddenly contains the variables AS or BASE. Basic doesn't convert the word AS into a token code when used in a Field statement, but leaves it in ASCII format. This means that the line

10 FIELD 1, 20 AS A\$, 20 AS B\$, 30 AS C\$, 40 AS D\$

would show four references to the variable AS in line 10. The same holds true for the word BASE, which is in ASCII format in the OPTION BASE statement. Once you get past these two items, you're all set. ■

You can reach Raymond Pelzer at 1823 Withey, Richmond, MI 48062.

Circle 159 on Reader Service card.

NEW DATABASE!

LITTLE BROTHER

for TRS80 Model 4/4P, Tandy
1000, 1200, 2000

EASY TO USE!

Menu driven - no complex command language to learn.

AUTO START-UP AND RUN!

Built in automatic job process. No creation of complex JCL or BATCH files necessary.

COMPLETE!

Includes Select and Sort, full Report Writer, printer control characters, etc.

SUPPORTED!

Full time support staff to answer any questions you may have.

BEST OF ALL - INEXPENSIVE!

The Little Brother data base - easy to learn and easy on your pocketbook!

TRSDOS 6.2 L-50-510 only \$99
MS-DOS L-86-510 only \$99

Domestic orders add \$1 shipping plus \$5 handling for orders not prepaid with check or money order.

**LOGICAL
SYSTEMS**
C.

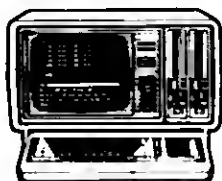
The New Retail Operation of LSI Products

P.O. Box 23956
Milwaukee, WI 53223

TOLL FREE ORDERLINE
(800) 248-3535

Information Number
(414) 355-5454

TRS-80 DISCOUNT



**Computers
at Guaranteed
Low Prices***

ATON CP/M FOR II, 12, 16

EPSON & NEC PRINTERS

DYSAN DISKETTES

HAYES MODEMS

**Desert Sound, Inc.
of California**

1-800-835-5247

Factory Authorized Dealer

TRS-80 is a Reg. Trademark of Tandy Corp.

***Call for FREE CATALOG
and Price Guarantee**

Calif. Res. Call 619-244-6883

Circle 498 on Reader Service card.

1000

1200

2000

16B/6000

PROFESSIONAL ACCOUNTING SOFTWARE

Payroll	General Ledger
Accounts Payable	Accounts Receivable
Mailing List	Inventory -
	Multi Whse.

YES !! Now you can get the **EXACT** same software to run on **ANY** of the Tandy MS-DOS Systems as well as the XENIX Multi-user Systems !!! References from Coast to Coast !!!

YES !! Onsite Installation, Training, as well as Custom Programming and Modification services are available !!!

YES !! Demos are available on all systems !!!

Systems Support, Inc.

P.O. Box 205

Berre, Vermont 05541
802-479-0160



Store and Dealership Inquiries Welcomed.

MS-DOS XENIX Trademarks of Microsoft Corp

Program Listing. Crosscheck.

```

10 'Read checksum totals into array
20 ON ERROR GOTO 230
30 CLS:PRINT @ 188, "LOADING CHECKSUM ARRAY"
40 DIM A(250)
50 FOR K=1 TO 250:READ A(K):NEXT
60 'Calculate checksum totals
70 CLS:PRINT @ 185, "CALCULATING CHECKSUM TOTALS":PRINT:PRINT
80 FOR J=1 TO 250
90 FOR K=1 TO 12:READ X: T=T+X: NEXT
100 IF T=A(J) THEN T=0: GOTO 140
110 CL=INT(J/10)*10+270
120 L=530+J*10: IS=RIGHT$(STR$(J),1): IF VAL(IS)=0 THEN IS=" 10"
130 PRINT "TOTAL OF LINE ";L;" DOES NOT EQUAL CHECKSUM TOTAL (LINE ";CL;" ITEM
";IS;)" : PRINT:PRINT "CORRECT DATA AND RUN PROGRAM AGAIN":CLOSE:END
140 NEXT
150 IF T<> A(J) THEN CL=INT((J-1)/10)*10+270:GOTO 120
160 '
170 'Write CMD file
180 CLS:PRINT @ 190, "WRITING CMD FILE"
190 RESTORE 540
200 OPEN "O",1,"BASREF/CMD"
210 FOR L=1 TO 2997: READ A:PRINT@1,CHR$(A);:NEXT
220 CLOSE:END
230 IF ERR=4 THEN 150
240 ON ERROR GOTO 0:RESUME
250 '
260 'Data statements for checksum verification
270 DATA 497,945,1849,1117,971,927,645,1187,1198,689
280 DATA 1266,1361,1134,1375,1386,997,780,803,1357,1167
290 DATA 1495,1638,1001,1704,1498,1306,1333,1012,947,939
300 DATA 1111,1808,1824,1515,1538,1421,2035,1879,1099,1879
310 DATA 1129,1171,1100,347,309,384,384,384,384,384
320 DATA 384,384,384,384,365,1627,1609,1862,1885,1805
330 DATA 1401,1133,1196,1126,1516,722,1358,1695,2235,1374
340 DATA 1343,1450,1220,1187,1484,1140,1205,1204,742,1606
350 DATA 1488,1752,1211,1371,1216,800,1321,556,1887,1725
360 DATA 1183,1625,1026,795,1459,1679,1346,1220,1708,1449
370 DATA 1328,1814,1810,1181,968,785,1403,1149,1675,400
380 DATA 1382,955,1607,1261,1262,1320,893,1267,1323,819
390 DATA 1060,1114,2815,3868,3868,2412,1254,1262,946,1451
400 DATA 1111,1362,1415,1181,1462,983,1399,1221,1559,1337
410 DATA 1602,1408,1613,1429,1442,1398,1138,1384,1502,1349
420 DATA 1216,1297,1845,1701,1388,1446,1208,1351,1799,1224
430 DATA 1481,643,1184,972,1829,1420,1877,1292,1357,1231
440 DATA 1356,1878,1180,1242,1197,1451,1841,1125,985,1003
450 DATA 1835,1308,1178,1292,1287,1273,1340,1150,1198,1381
460 DATA 1280,1298,1348,1132,1138,923,1684,1149,1185,1365
470 DATA 1386,1232,1139,1330,1216,1335,1245,1164,1121,997
480 DATA 1096,1354,1346,1369,1318,1249,1269,1813,1089,1154
490 DATA 1379,1154,1253,1340,1143,1128,1400,1624,940,1073
500 DATA 1202,668,618,796,858,1185,779,1877,1223,662
510 DATA 929,777,715,712,660,1589,585,1097,1810,272
520 '
530 ' Data Statements for CMD file
540 DATA 5,6,66,65,83,82,69,78,1,2,0,48
550 DATA 229,33,116,58,62,10,239,33,0,0,62,103
560 DATA 239,62,101,239,253,283,10,134,253,203,10,142
570 DATA 225,17,111,60,62,78,239,40,7,33,187,58
580 DATA 62,10,239,201,17,10,59,62,17,239,40,7
590 DATA 33,203,58,62,10,239,201,6,5,33,18,59
600 DATA 35,35,35,35,35,35,35,35,126,183,40,16
610 DATA 230,64,32,12,126,254,120,40,7,33,203,58
620 DATA 62,10,239,201,35,35,16,224,58,76,59,183
630 DATA 40,21,58,78,59,183,40,15,33,128,0,34
640 DATA 141,50,33,126,58,34,211,51,34,232,51,253
650 DATA 203,18,198,253,203,18,166,33,82,59,17,111
660 DATA 60,6,0,62,59,239,194,161,49,62,3,239
670 DATA 194,161,49,254,255,40,37,33,222,58,62,10
680 DATA 239,201,10,78,185,188,181,32,182,111,117,110
690 DATA 100,32,45,32,118,111,119,32,108,111,97,180
700 DATA 165,118,103,46,46,46,10,13,33,158,48,62
710 DATA 10,239,33,0,0,6,0,62,108,239,34,00
720 DATA 59,33,144,66,205,149,49,71,245,149,49,184
730 DATA 32,14,183,32,11,62,255,119,35,205,170,49
740 DATA 119,195,158,58,205,149,49,119,35,205,170,49
750 DATA 205,149,49,119,35,205,170,49,205,149,49,254
760 DATA 34,202,135,49,1,2,0,49,119,35,205,170
770 DATA 49,254,0,48,199,254,228,40,107,254,255,32
780 DATA 10,205,149,49,119,35,205,170,49,24,221,254
790 DATA 132,40,89,254,143,40,85,254,14,32,10,205
800 DATA 149,49,119,35,205,170,49,205,149,49,119,35
810 DATA 205,170,49,24,191,254,28,32,0,43,6,2
820 DATA 205,114,49,24,179,254,29,32,0,43,6,4
830 DATA 205,114,49,24,167,254,31,32,0,43,6,8
840 DATA 205,114,49,254,15,32,5,205,149,49,24,16
850 DATA 254,15,218,248,48,254,27,218,248,48,43,195
860 DATA 248,48,205,149,49,16,251,201,205,149,49,254
870 DATA 0,32,249,119,35,205,170,49,195,208,48,205
880 DATA 149,49,254,34,202,248,48,254,0,48,236,24
890 DATA 242,213,205,0,52,17,111,60,62,3,239,209
900 DATA 200,79,203,241,33,255,259,62,26,239,229,213
910 DATA 237,91,80,59,235,183,237,82,209,225,208,33
920 DATA 192,49,62,10,239,62,22,239,10,66,65,83
930 DATA 73,67,32,112,114,111,103,114,97,109,32,115
940 DATA 105,122,101,32,101,120,99,101,101,100,115,32
950 DATA 97,118,97,105,108,97,98,108,101,32,109,101
960 DATA 109,111,114,121,32,45,32,97,98,111,114,116
970 DATA 46,10,10,13,144,60,0,0,0,0,32,32
980 DATA 1,2,0,50,32,32,32,32,32,32,32,32
990 DATA 32,32,32,32,32,32,32,32,32,32,32,32
1000 DATA 32,32,32,32,32,32,32,32,32,32,32,32
1010 DATA 32,32,32,32,32,32,32,32,32,32,32,32
1020 DATA 32,32,32,32,32,32,32,32,32,32,32,32

```

Listing continued

1030 DATA 32,32,32,32,32,32,32,32,32,32,32,32
 1040 DATA 32,32,32,32,32,32,32,32,32,32,32,32
 1050 DATA 32,32,32,32,32,32,32,32,32,32,32,32
 1060 DATA 32,32,32,32,32,32,32,32,32,32,32,32
 1070 DATA 32,32,32,32,32,32,32,32,32,32,32,32
 1080 DATA 32,32,32,32,32,32,32,32,32,32,32,13
 1090 DATA 228,213,197,245,33,254,49,17,255,49,54,32
 1100 DATA 1,78,0,237,176,241,193,289,225,201,17,111
 1110 DATA 60,62,60,239,194,161,49,33,111,60,1,32
 1120 DATA 0,62,3,237,177,54,13,33,91,60,205,150
 1130 DATA 51,14,13,205,165,51,14,13,205,165,51,50
 1140 DATA 78,59,183,202,223,52,33,122,51,205,150,51
 1150 DATA 33,144,60,35,34,248,48,42,144,60,34,250
 1160 DATA 49,34,252,48,17,254,49,62,97,239,33,61
 1170 DATA 62,34,4,50,221,33,146,60,237,75,144,60
 1180 DATA 237,67,252,49,42,250,49,221,126,0,183,40
 1190 DATA 42,205,8,52,254,14,32,61,1,2,0,51
 1200 DATA 221,35,221,78,0,221,35,221,70,0,221,35
 1210 DATA 183,229,237,66,225,32,224,285,100,51,62,1
 1220 DATA 221,119,253,221,119,254,221,119,255,24,208,221
 1230 DATA 35,221,78,0,221,35,221,78,0,221,35,237
 1240 DATA 67,252,49,62,255,185,32,187,184,40,6,24
 1250 DATA 182,221,35,24,178,205,180,51,42,248,49,35
 1260 DATA 126,254,14,32,4,35,35,24,246,183,32,243
 1270 DATA 35,78,35,78,35,14,248,49,237,67,250,49
 1280 DATA 62,255,184,32,4,185,202,68,52,197,225,17
 1290 DATA 254,49,62,97,239,33,61,62,34,4,50,195
 1300 DATA 228,50,76,105,110,101,32,78,117,109,98,101
 1310 DATA 114,115,32,114,101,102,101,114,101,110,99,101
 1320 DATA 180,58,10,13,7,50,62,10,239,58,76,59
 1330 DATA 183,200,62,14,239,194,161,49,201,62,2,239
 1340 DATA 58,76,59,183,200,62,6,239,194,161,49,201
 1350 DATA 229,197,213,205,0,52,42,252,49,62,255,180
 1360 DATA 32,3,189,40,22,237,91,148,51,62,97,239
 1370 DATA 19,19,237,83,148,51,33,76,58,235,183,237
 1380 DATA 82,56,41,237,91,148,51,33,76,58,183,237
 1390 DATA 82,40,29,33,76,58,126,254,32,32,3,43
 1400 DATA 24,240,35,54,13,33,254,49,205,150,51,205
 1410 DATA 120,50,33,7,1,2,0,52,50,34,148,51
 1420 DATA 209,183,225,201,253,203,10,78,32,35,253,203
 1430 DATA 10,78,200,253,203,10,142,253,203,10,150,213
 1440 DATA 245,62,8,239,40,12,253,203,10,78,32,9
 1450 DATA 253,203,10,86,40,239,241,209,201,33,50,52
 1460 DATA 62,10,239,62,22,239,10,181,91,66,114,101
 1470 DATA 97,107,93,10,13,14,13,205,165,51,14,13
 1480 DATA 205,165,51,221,33,146,60,237,75,144,60,62
 1490 DATA 255,184,32,4,185,202,213,52,221,126,0,205
 1500 DATA 8,52,183,40,45,254,14,221,35,32,241,221
 1510 DATA 116,0,221,35,221,102,0,221,35,17,206,52
 1520 DATA 197,62,97,239,193,197,225,17,170,52,197,62
 1530 DATA 97,239,193,33,164,52,205,150,51,205,8,52
 1540 DATA 24,202,221,35,221,78,0,221,35,221,70,0
 1550 DATA 221,35,24,179,76,105,110,101,32,35,40,40
 1560 DATA 48,48,48,32,114,101,102,101,114,101,110,99
 1570 DATA 101,115,32,110,111,110,45,101,120,105,115,116
 1580 DATA 97,110,116,32,110,105,110,101,32,35,57,57
 1590 DATA 57,57,57,46,13,14,13,205,165,51,14,13
 1600 DATA 205,165,51,58,74,59,183,202,196,53,33,124
 1610 DATA 53,205,150,51,14,13,205,165,51,33,154,55
 1620 DATA 221,33,144,60,126,35,183,202,109,53,254,255
 1630 DATA 1,2,0,53,6,0,32,3,71,126,35,79
 1640 DATA 205,128,58,17,254,49,126,203,127,32,8,183
 1650 DATA 40,5,18,35,19,24,243,221,94,0,221,35
 1660 DATA 221,86,0,221,35,237,83,252,49,62,255,180
 1670 DATA 32,8,187,32,5,205,180,51,24,180,221,126
 1680 DATA 0,221,35,183,40,221,254,14,32,6,221,35
 1690 DATA 221,35,24,32,184,48,18,254,255,32,4,221
 1700 DATA 35,24,21,185,32,18,62,255,184,40,13,24
 1710 DATA 8,221,126,0,221,35,185,32,3,205,180,51
 1720 DATA 205,8,52,24,201,205,180,51,14,13,205,165
 1730 DATA 51,14,13,205,165,51,24,72,10,66,65,83
 1740 DATA 73,67,32,75,101,121,119,111,114,100,115,32
 1750 DATA 114,101,102,101,114,101,110,98,101,100,58,13
 1760 DATA 10,255,255,255,255,255,255,255,255,255,255
 1770 DATA 255,255,255,255,255,255,255,255,255,255,255
 1780 DATA 255,255,255,255,255,255,255,255,255,255,255
 1790 DATA 255,255,255,255,255,255,255,255,255,255,255
 1800 DATA 282,133,55,205,128,50,14,13,205,165,51,33
 1810 DATA 184,55,205,150,51,221,33,144,60,33,153,53
 1820 DATA 6,42,54,255,35,16,251,6,42,33,153,53
 1830 DATA 221,94,0,221,35,221,86,0,221,35,62,255
 1840 DATA 186,32,4,187,202,160,54,221,1,2,0,54
 1850 DATA 126,0,221,35,183,40,224,205,8,52,254,14
 1860 DATA 32,6,221,35,221,35,24,235,254,65,56,231
 1870 DATA 254,91,40,227,190,56,51,32,72,35,5,40
 1880 DATA 68,221,126,0,221,35,183,40,186,205,123,54
 1890 DATA 32,19,48,25,119,175,176,40,5,35,54,255
 1900 DATA 16,251,6,42,33,151,53,24,186,126,254,255
 1910 DATA 40,244,43,24,236,190,40,209,40,23,119,5
 1920 DATA 40,232,221,126,0,183,40,221,221,35,35,205
 1930 DATA 123,54,56,206,40,236,43,24,208,221,126,0
 1940 DATA 183,221,35,202,231,53,205,123,54,56,199,40
 1950 DATA 240,24,195,79,205,8,52,254,91,40,38,254
 1960 DATA 65,48,30,254,37,208,254,36,208,254,35,208
 1970 DATA 254,33,208,254,40,32,2,55,201,254,40,56
 1980 DATA 4,254,58,56,4,246,1,121,201,175,121,201
 1990 DATA 58,153,53,254,255,202,133,55,6,43,33,153
 2000 DATA 53,126,254,255,40,3,35,16,248,54,13,33
 2010 DATA 152,53,205,150,51,221,33,144,60,221,94,0
 2020 DATA 221,35,221,86,0,221,35,237,83,252,49,62
 2030 DATA 255,186,32,19,187,32,16,205,180,51,33,153
 2040 DATA 53,6,42,54,255,35,16,251,195,217,53,33
 2050 DATA 153,53,205,8,52,221,126,0,221,35,183,40
 2060 DATA 204,254,14,32,1,2,0,55,6,221,35,221
 2070 DATA 35,24,232,254,65,56,228,254,91,40,224,190
 2080 DATA 40,19,221,126,0,221,35,183,40,175,205,123
 2090 DATA 54,56,208,40,241,221,43,24,202,221,34,102

2100 DATA 55,35,126,254,13,32,10,221,126,0,205,123
 2110 DATA 54,40,219,24,13,221,126,0,190,32,211,221
 2120 DATA 35,205,123,54,40,227,205,180,51,221,229,221
 2130 DATA 42,102,55,221,43,221,126,0,205,123,54,32
 2140 DATA 9,62,1,221,119,0,221,35,40,239,221,225
 2150 DATA 24,137,0,0,10,66,65,83,73,67,32,86
 2160 DATA 97,114,105,97,98,108,101,115,32,114,101,182
 2170 DATA 101,114,101,118,99,101,100,58,13,33,82,60
 2180 DATA 205,150,51,50,76,59,183,33,0,0,200,14
 2190 DATA 12,62,6,238,24,245,220,39,245,42,243,43
 2200 DATA 244,45,246,47,242,60,241,61,240,62,255,134
 2210 DATA 65,66,83,248,65,78,60,255,149,65,83,67
 2220 DATA 255,142,65,84,78,171,65,85,84,79,182,67
 2230 DATA 65,76,76,255,158,67,68,66,76,185,67,72
 2240 DATA 65,73,78,255,158,67,72,82,36,255,156,67
 2250 DATA 73,78,84,146,67,76,69,65,82,195,67,76
 2260 DATA 79,83,69,159,67,76,83,184,67,79,77,77
 2270 DATA 79,78,153,67,79,78,84,255,140,67,79,83
 2280 DATA 1,2,0,56,255,157,67,83,78,71,255,172
 2290 DATA 67,86,68,255,170,67,86,73,255,171,67,86
 2300 DATA 83,132,68,85,84,62,222,68,65,84,68,36
 2310 DATA 151,68,69,78,176,68,69,78,68,66,76,174
 2320 DATA 68,68,78,73,78,84,175,66,69,78,83,78
 2330 DATA 71,173,68,69,78,83,84,82,178,68,69,76
 2340 DATA 69,84,69,134,68,73,77,62,69,68,73,84
 2350 DATA 162,69,76,83,68,128,69,78,68,255,173,69
 2360 DATA 79,78,251,69,81,86,166,69,82,65,83,69
 2370 DATA 215,69,82,76,216,69,82,82,168,69,82,82
 2380 DATA 78,82,223,69,82,82,82,36,255,139,69,88
 2390 DATA 80,192,78,73,69,76,68,255,159,78,73,88
 2400 DATA 212,78,78,130,78,79,82,255,143,78,82,69
 2410 DATA 183,71,69,84,141,71,79,83,85,66,137,71
 2420 DATA 78,84,79,255,154,72,69,88,36,139,73,70
 2430 DATA 252,73,77,80,224,73,78,75,69,89,36,255
 2440 DATA 144,73,78,84,133,73,78,80,85,84,219,73
 2450 DATA 78,83,84,82,255,133,73,78,84,200,75,73
 2460 DATA 76,76,255,129,76,69,78,84,36,255,146,76
 2470 DATA 69,78,136,76,69,84,177,76,73,78,69,147
 2480 DATA 76,73,83,84,158,76,76,73,83,84,186,76
 2490 DATA 79,65,68,255,174,76,79,67,1,2,0,57
 2500 DATA 255,175,76,79,70,255,138,76,79,71,255,155
 2510 DATA 76,80,79,83,157,76,80,82,73,78,84,201
 2520 DATA 76,83,69,84,225,77,69,73,197,77,69,82
 2530 DATA 71,69,255,131,77,73,68,36,255,178,77,75
 2540 DATA 68,36,255,176,77,75,73,36,255,177,77,75
 2550 DATA 83,36,253,77,78,68,199,78,65,77,69,148
 2560 DATA 78,69,87,131,78,69,80,84,214,78,79,84
 2570 DATA 255,153,79,67,84,36,149,79,78,191,79,80
 2580 DATA 69,78,186,78,80,84,73,79,78,249,79,82
 2590 DATA 156,79,85,84,255,151,80,69,69,75,152,80
 2600 DATA 79,75,69,255,145,80,79,83,145,80,82,73
 2610 DATA 78,84,194,80,85,84,187,82,65,78,68,79
 2620 DATA 77,135,82,69,65,80,143,82,69,77,172,82
 2630 DATA 69,78,85,77,140,82,69,83,84,79,82,69
 2640 DATA 169,82,69,83,85,77,69,142,82,69,84,85
 2650 DATA 82,78,255,130,82,73,71,72,84,36,255,136
 2660 DATA 82,78,68,255,179,82,79,87,202,82,83,69
 2670 DATA 84,138,82,85,78,203,83,65,86,69,255,132
 2680 DATA 83,71,78,255,137,83,73,78,205,83,79,85
 2690 DATA 78,68,255,152,83,80,65,67,69,36,213,83
 2700 DATA 80,67,40,255,135,83,81,82,218,83,84,69
 2710 DATA 80,144,83,84,1,2,0,50,79,80,255,147
 2720 DATA 83,84,82,36,217,83,84,82,73,78,1,36
 2730 DATA 165,83,87,65,80,189,83,89,83,84,69,77
 2740 DATA 289,84,65,66,48,255,141,84,65,78,208,84
 2750 DATA 72,69,78,226,84,73,77,69,36,207,84,79
 2760 DATA 164,84,82,79,78,78,163,84,82,79,78,210
 2770 DATA 85,83,73,78,71,211,85,83,82,255,148,86
 2780 DATA 65,76,221,86,65,82,80,84,82,150,87,65
 2790 DATA 73,84,181,87,69,78,68,180,87,72,73,76
 2800 DATA 69,183,87,82,73,84,69,250,88,79,82,254
 2810 DATA 92,247,84,0,10,77,11,100,101,108,32,52
 2820 DATA 32,66,65,83,73,67,32,67,114,111,115,115
 2830 DATA 45,82,101,102,101,114,101,110,99,101,32,85
 2840 DATA 116,105,108,105,116,121,106,101,114,115,105
 2850 DATA 111,110,32,49,46,48,46,48,32,32,32,82
 2860 DATA 74,80,46,32,32,48,54,47,50,52,47,56
 2870 DATA 52,10,13,10,66,97,100,32,102,105,100,101
 2880 DATA 115,112,101,99,10,14,13,10,80,97,114,97
 2890 DATA 109,101,116,101,114,32,69,114,114,111,114,10
 2900 DATA 10,13,10,78,105,180,101,32,105,115,32,78
 2910 DATA 79,84,32,105,110,32,115,116,97,110,100,97
 2920 DATA 114,100,32,99,111,109,112,114,101,115,115,101
 2930 DATA 1,84,0,59,100,32,66,65,83,73,67,32
 2940 DATA 102,111,114,109,97,116,33,10,10,13,128,86
 2950 DATA 76,73,78,69,83,32,0,78,59,86,86,65
 2960 DATA 82,32,32,32,0,72,59,86,75,89,89,87
 2970 DATA 68,83,0,74,59,86,80,82,84,32,32,32
 2980 DATA 0,76,59,86,87,73,68,69,32,32,0,78
 2990 DATA 59,0,255,255,255,255,255,255,0,0,0,0
 3000 DATA 0,0,1,31,82,60,10,69,110,100,32
 3010 DATA 111,102,32,67,114,111,115,115,45,82,101,102
 3020 DATA 101,114,101,110,99,101,32,102,111,114,32,1
 3030 DATA 4,143,60,13,0,2,2,0,48

End



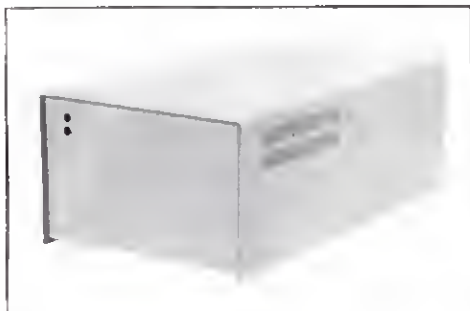
Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

PRICE BREAKTHROUGH

Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

80

Super Sale on New Hard Drives



Introducing

MEGADISK™

Winchester Hard Drive Ready to
run on the TRS 80 Model I/III/IV/4P,
Color Computer, I.B.M.-PC, Max/80.
Software Drivers: LDOS, NEWDOS/80,
DOSPLUS, TRSDOS 6.x

*Montezuma Micro CP/M available

**Fully Warranted
DRIVE A HARD BARGAIN™ starting at \$599.95**

MEGAPLEX your Megadisk for \$899.95

Use up to 4 computers, multiplexed with 1 megadisk
Easy to install

Call Toll Free Ordering 1-800-343-8841



Disk Drive Upgrade Kit
for Model III/IV easy to install
system — no soldering.
Complete with controller, towers,
power supply, 1 disk drive, cables,
and easy to follow instructions.
Starting at \$289.95

CANADIAN CUSTOMERS PLEASE CALL 514-662-3224

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.

WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.

PRICE BREAKTHROUGH

DEALER INQUIRIES INVITED

Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.

MEGADISK™ HARD DISK DRIVE SYSTEMS

For the { IBM/PC, Tandy 1000, TRS/80 Models 1/III/IV/4P, Compaq, Tava, PC Workalikes, Color Computers, Heath/Zenith, Max/80
Complete with Hardware, Cables, Software and Quikfit Installation

TOLL FREE ORDERING 1-800-343-8841

5 Megabytes Internal Mount	starting at \$ 299.95
10 Megabytes Internal Mount	starting at 479.95
20 Megabytes Internal Mount	starting at 679.95
5 Megabytes External System	starting at 599.95
10 Megabytes External System	starting at 799.95
20 Megabytes External System	starting at 999.95
Tape Backup System — Internal Or External	starting at 499.95

Wow! New Low Prices

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later
TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus 3.5, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

FLOPPY DISK DRIVES, POWER SUPPLIES AND CABINETS

Our Disk Drives are UL approved — Our Floppy Drive Cabinets and Power Supplies are Underwriters Laboratory Listed and have passed the required Federal Communications Part 15 Section B-EMI/RFI tests.

Warranty on all disk drives is one full year parts and labor. Warranty on Floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives and power supplies.

Tandon — Full Height Drives	
100-1 Single Sided 40 tk Bare	\$120.00
In Case with Power Supply	149.95
Dual Drives in One Cabinet	279.95
100-2 Dual Sided 40 tk Bare	130.00
In Case with Power Supply	174.95
Dual Drives in One Cabinet	314.95
Half High Drives	
65-1 Single Sided 40 tk Bare	89.95
In Case with Power Supply	129.95
Dual Drives in One Cabinet	219.95
65-2 Dual Sided 40 tk Bare	115.00
In Case with Power Supply	154.95
Dual Drives in One Cabinet	269.95
TEAC Half High Drives	
55A Single Sided 40 tk Bare	89.95
In Case with Power Supply	129.95
Dual Drives in One Cabinet	219.95
55B Dual Sided 40 tk Bare	115.95
In Case with Power Supply	154.95
Dual Drives in One Cabinet	269.95
55F Dual Sided 80 tk Bare	140.00
In Case with Power Supply	184.95
Dual Drives in One Cabinet	324.95
Apple/Franklin Disk Drives	
35/40 Track in Case with Cable and Software	129.95
Commodore Disk Drive	236.95
Power Supplies and Cabinets 5 1/4" and Hard Drive Systems	starting at 42.00

COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS

40 Track Single Head Drive with Case, Power Supply, Cable	
Controller, Instruction Booklet, Diskettes	\$229.95
Above with Dual Drives in One Cabinet	319.95
40 Track Dual Head with Case, Power Supply, Cable,	
Controller, Instruction Booklet, Diskettes	269.95
Above with Dual Drives in One Cabinet	384.95
128 Memory Upgrade Kit	\$Call
Dual DOS Switch	29.95
With Second DOS System — JDOS, RSDOS, and Booklet	69.95

MODEMS

Volkmodem 300 Baud	\$ 69.95
Signalman Mark X Autodial	123.95
Mark XII 1200/300 Baud Autodial	284.95

ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.

***** MEGADISK SPECIAL *****

With a 10 megabyte system, you can purchase a complete IBM or PC compatible host, software and cable for only \$15.00!!
P.S. Ask about the MEGAPLEXER.

IBM - PC/XT WORKALIKE

All of our computers have: 8 slot motherboard, 640K, monochrome adapter, parallel printer port, 130 watt power supply, free software — all with our full warranty.	
/PC-2 Floppy Drives - Monochrome Monitor, MS-DOS	\$1,595.00
Color system resolution - 720h x 240v, MS-DOS	\$1,995.00
Single XT/XTA - 1 Floppy Drive - Monochrome Monitor, MS-DOS	\$1,495.00
Color system resolution - 720h x 240v, MS-DOS	1,995.00
10meg/XT/XTA - 1 Floppy Drive - Monochrome Monitor, MS-DOS	1,795.00
XT/XTA - Color system resolution - 720h x 240v, MS-DOS	2,295.00
20meg/XT/XTA - 1 Floppy Drive - Monochrome Monitor, MS-DOS	1,995.00
XT/XTA - Color system, MS-DOS	2,495.00
Internal Tape Backup For Any Of Above systems Add	\$449.95

PRINTERS

Dot Matrix	
Citizen	\$ Call
Star Micronics	
Gemini 120 CPS Near letter quality	starting at \$259.95
Delta 10/15 160 CPS	starting at 424.95
Radix 10/15 200 CPS	starting at 649.95
Panasonic 1090	249.95
Daisy Wheel	
Silver Reed 440 80 Column 12 CPS	315.95
550 132 Column 19 CPS	439.95
770 132 Column 36 CPS	895.00
Olympia 132 Column 14 CPS with Form and Tractor	399.95
Apple/Franklin Printer Interface w/Graphics and Cable	84.95
Printer Cables	starting at 19.95
Printer Paper — Microperf Edge 1000 Sheets	16.95

ELECTRICAL

Surge Protectors — Line Filters — SI Waber — 6 Outlets with Switch	\$ 39.95
Uninterruptable Power Supplies	399.95

MISCELLANEOUS

Diskettes in 10 Pack	from \$ 9.95
Twoprint Switches	from 99.95
Disk Drive Cables	from 16.00
Maintenance Cleaning Kits	12.00
Parallel Printer Buffers 8K	149.95
Floppy Disk Drive Cables	
1 Drive	16.00
2 Drives	18.95
Heath/Zenith 2 Drive Cables — Shielded	24.95

80

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.

WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

Memories are Made of This: An I/O-Accessed Memory Board

Now that MS-DOS computers can access megabytes of memory, TRS-80 users feel left behind. This month's Project 80 will rectify that: It's an input/output (I/O-) accessed memory board. While the board I'll describe has only limited memory, you can add almost as much memory as you want. And with the proper software driver, you can use this memory board as a high-speed RAM disk. Also, with certain RAM chips, you can access special information whenever you turn on the computer.

The computer industry supports a memory device standard known as JEDEC that dictates compatible pin arrangements for RAM and ROM devices. You can install a number of memory devices in a socket that conforms to the JEDEC standard. In addition, on-board jumpers associated with the socket often allow for slight pin differences between devices. You can buy both 24-pin and 28-pin JEDEC devices, and 24-pin devices also work in a 28-pin JEDEC socket.

The block diagram for the I/O-accessed JEDEC memory board appears in Fig. 1; see the Photo for a picture of it. The memory board contains a 24-pin JEDEC standard socket, so you can install a 2K or 4K ROM/EPROM or 2K static RAM. You access the memory device via I/O commands from the TRS-80, instead of from memory space. This is particularly beneficial since many computers lack additional processor memory space.

24-Pin JEDEC Memory Devices

You can install a number of devices on the JEDEC memory board, including (but not limited to) the 2716 EPROM (2K), the 2732A EPROM (4K), and the 6116 static RAM (2K). All represent common and inexpensive memory devices.

Another JEDEC-compatible device useful in many applications is the Mostek Zeropower RAM chip (2K) shown, installed, in the Photo. This chip works like a 6116 RAM, but with a built-in lith-

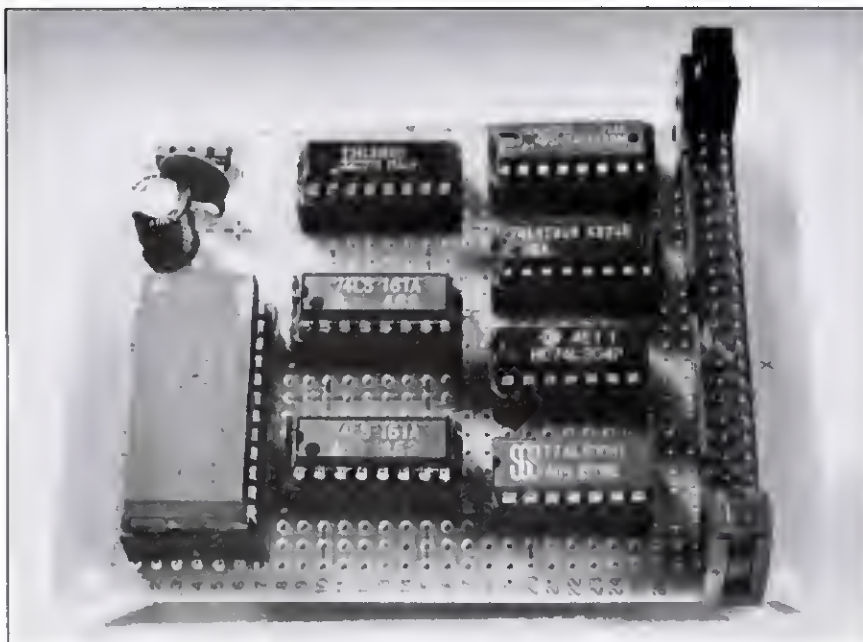


Photo. I/O-accessed JEDEC memory board.

ium battery and the circuitry to power RAM-based memory when you turn off the computer. The battery's life expectancy is 10 years.

The implications of such a device are broad. You can update information in its memory while you use the computer, and have the information available the next time you turn the unit on. You could, for example, keep track of how much time you have your computer on, or when you last used the computer.

You should use a memory device with an access time of 450 or fewer ns, which isn't much of a limitation.

Building the I/O-Accessed JEDEC Memory Board

The schematic for the memory board appears in Fig. 2. Table 1 lists the parts necessary, minus the memory devices you'll use, since this is up to you. You'll find most of the memory devices available from mail-order electronic parts companies. Contact Mostek Corporation

(see Fig. 3 for manufacturers' addresses) for your nearest Mostek distributor if you want the Zeropower RAM.

Building the board is straightforward when you follow the schematics in Fig. 2, though I will emphasize some points. First, the board uses four I/O address locations. Two jumpers near the 74LS138 let you select one of four address ranges. I chose address range 2CH-2FH by jumpering as shown by the dotted lines in the schematic. The programs discussed later assume this decoding. Table 2 indicates possible address decoding.

Second, you can either put jumpers on the board (for flexibility in the JEDEC device you put in the 24-pin socket) or you can hard-wire the socket for a particular device. The dotted line on the schematic shows the jumper scheme I used for the Zeropower RAM.

Finally, be sure the '161 device you use is a 74LS161A—don't substitute a 74161 or use an LS device without the A suffix, lest you spend a long time won-

**From The God
of Communications
A Divine Modem at a
Miracle Price**



Look!

- **100% Hayes Smart-modem* Compatible**, that is **Mercury** runs with all the popular private or public domain communications software
- **300/1200 Baud Speed**, software or hardware (dip switch) selectable. The 1200 baud feature will save you a bundle in long distance connections
- **Auto Dial**
- **Auto Answer**
- **Auto Speed Selection**
- **Audio Monitor**, via speaker with volume control
- **Front Panel Lights**, give you at a glance full information on the status and mode of your communication
Modem Ready-Terminal Ready
Carrier Detect-Send Data
Receive Data-High Speed
Auto Answer-Off Hook
- **Clear & Easy to Read Manual**. If modeming is new for you, the **Mercury** Manual will ease your way into the exciting and rewarding world of data transmission
- **Elegant**, Mercury fits tastefully under your telephone set
- **18 Months Warranty**

\$265.00

Including power supply, telephone cable and manual
Computer to Modem Cable (\$18.00)
Shipping \$3.00 anywhere in continental U.S.

**Computer
Friends**

6415 SW Canyon Ct
Portland, OR 97221
(503)297-2321 (24 Hours line)

**Order Toll Free
1-800-547-3303**

or ask for free brochure
Dealers Inquiries Welcome

*Hayes is a registered trademark of Hayes Microcomputer Corp.

Buy the Best CP/M[®] for Tandy computers.

Pickles & Trout CP/M is the product of over four years of experience with Radio Shack computers — and their users. Thousands of people use it with pleasure. So can you.

IT'S FLEXIBLE

With P&T CP/M 2, you can take advantage of every feature of your Mod II/12/16/6000. Choose from among the 2000 or more CP/M-80 programs now on the market. Use Radio Shack or non-Radio Shack printers, plotters, modems, terminals and other peripherals. Share a Radio Shack hard disk with either Xenix[®] or TRSDOS[®].

IT'S WELL-SUPPORTED

The fully-indexed P&T manual is understandable and comprehensive. And our experienced support staff is always available to help you.

IT'S COMPACT AND POWERFUL

P&T CP/M 2 packs a lot of power into as little as 8.5 Kbytes of RAM. Its many unique features include a master diskette that automatically copies itself, an easily-used system MENU, 20 special utilities, programmable keys, a full-screen editor, a screen print function, and many extra programming tools.

IT'S A BARGAIN

The floppy disk version of P&T CP/M 2 is only \$200. Hard disk versions are \$250. No hardware modifications are required.

Order today or use the attached coupon to find out more about the best CP/M for your Mod II/12/16/6000.

Name _____

Address _____

City _____

State _____

Zip _____

Phone _____

or send us your business card.



Pickles & Trout[®]
P.O. Box 1206, Goleta, California 93116
(805) 685-4641

'80

TRSDOS[®] & TRS-80[®] Radio Shack/Tandy Corporation; CP/M[®] Digital Research;
XENIX[®] Microsoft Corp.; Pickles & Trout[®] Pickles & Trout ©1985 Pickles & Trout

dering why your board doesn't work. Most distributors merely list a 74LS161 part number, so contact them before ordering to make sure it's the correct part. The 74LS161A operates slightly differently from the 74161. I ordered some 74LS161s from one company and got 74LS161Bs, only to find that (after a couple hours of debugging!) you can't substitute it for the 74LS161A.

Besides the parts indicated in the parts list, you will need five 16-pin sockets, two 14-pin sockets (three for the Models III and 4), and a single 24-pin socket. You will also need a +5-volt power supply capable of supplying 400 or fewer milliamps if you use the CMOS 6116 RAM chip.

Operating the I/O-Accessed Memory Board

The 74LS138 decodes the four-location I/O addressing range the board uses. The 74LS139 decodes each of the board's four specific addresses. I will use the 2CH-2FH addressing range for this discussion, though you can use other ranges (as described earlier).

The 74LS161As are actually the key chips on this board. They function as both 4-bit latches and up-counters. The three of them form a 12-bit address register, used to hold the address of the memory location accessed in the JEDEC memory device. The location the

74LS161As point to is read/written when either I/O port location 2CH or 2DH is read/written.

If you use I/O port 2CH to access the memory location, the address contained in the 74LS161As is incremented after the memory access; if you use I/O port 2DH, the address is left unchanged. The remaining I/O port locations write the desired memory access address to the 74LS161As. The function of each I/O location appears in Table 3.

Because you can only access the memory in the JEDEC socket from I/O port addresses, you can't execute any routines in the JEDEC memory device directly. You first have to bring them into

Quantity	Description	Distributor	Part number	Price (each)
1	74LS138 3-TO-8 decoder IC	JDR	74LS138	.55
1	74LS139 dual 1-of-4 decoder/multiplexer (LS TTL) IC	JDR	74LS139	.55
3	74LS161A latching 4-bit binary counter (LS TTL) IC	JDR	74LS161A	.65
1	74LS00 quad two-input NAND gate (LS TTL) IC	JDR	74LS00	.24
1	7416 hex inverter/drivers (O.C.) (LS TTL) IC**	JDR	7416	.25
1	74LS02 quad NOR gate (LS TTL) IC**	JDR	74LS02	.25
2	.1 uF/50-volt disc capacitor	RS	272-135	.25
1	47 uF/35-volt electrolytic capacitor (OPC mount)	RS	272-1027	.69
1	.1 inch matrix grid prototype board	RS	276-158	1.95
1	40-position cable header (W/WO)*	DK	R241-ND	5.58
1	40-position ribbon cable edge connector*	DK	R503-ND	3.80
1	40-position ribbon cable socket connector*	DK	R306-ND	3.73
8	inches 40-conductor ribbon cable*	DK	R007-ND	0.00
1	50-position cable header (W/WO)**	DK	R247-ND	6.93
1	50-position ribbon cable edge connector**	RS	276-1566	4.95
1	50-position ribbon cable socket connector**	DK	R307-ND	4.65
8	inches 50-conductor ribbon cable**	DK	R008-ND	NA

* Model I only

** Models III and 4/4P

Parts Distributors

JDR Microdevices (JDR), 1224 S. Bascom Ave., San Jose, CA 95128, 800-662-6279. Outside CA: 800-538-5000, 408-995-5430.

Digi-Key Corp. (DK), Highway 32 South, P.O. Box 677, Thief River Falls, MN 56701, 800-346-5144 or 218-681-6674.

Tandy/Radio Shack (RS), National Products Division, 900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662.

Table 1. Parts list.

E2/ A6/	E3 A5/	I/O Address Range
A6/	A5/	4CH-4FH
A6/	A5	6CH-6FH
A6	A5/	0CH-0FH
A6	A5	2CH-2FH

Table 2. Possible address decoding.

Port	Description
2CH	Read/write current memory location the 74LS161As point to, then increment the address the 74LS161As put out.
2DH	Read/write current memory location the 74LS161As point to without affecting the address the 74LS161As put out.
2EH	Write low byte of the memory address to the two low-order 74LS161As.
2FH	Write the high nibble of the memory address to the high-order 74LS161A.

Table 3. I/O location functions.

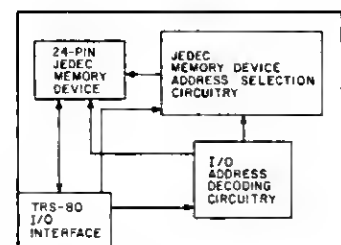


Figure 1. Block diagram of I/O-accessed memory board.

the computer's main memory where the Z80 CPU can access them for execution.

This simple one-line Basic program reads 2,048 bytes of information from a memory device on the board into the computer's main memory, starting at the address assigned to the variable PA (30000 below).

```
10 OUT 46.0:OUT 47.0:PA = 30000:FOR
  I = 1 TO 2048:POKE PA,INP(44):
  PA = PA + 1:NEXT I
```

You only need a single-line program to move information from the JEDEC memory device to the computer's main memory (you could also execute the line immediately, without making it a pro-

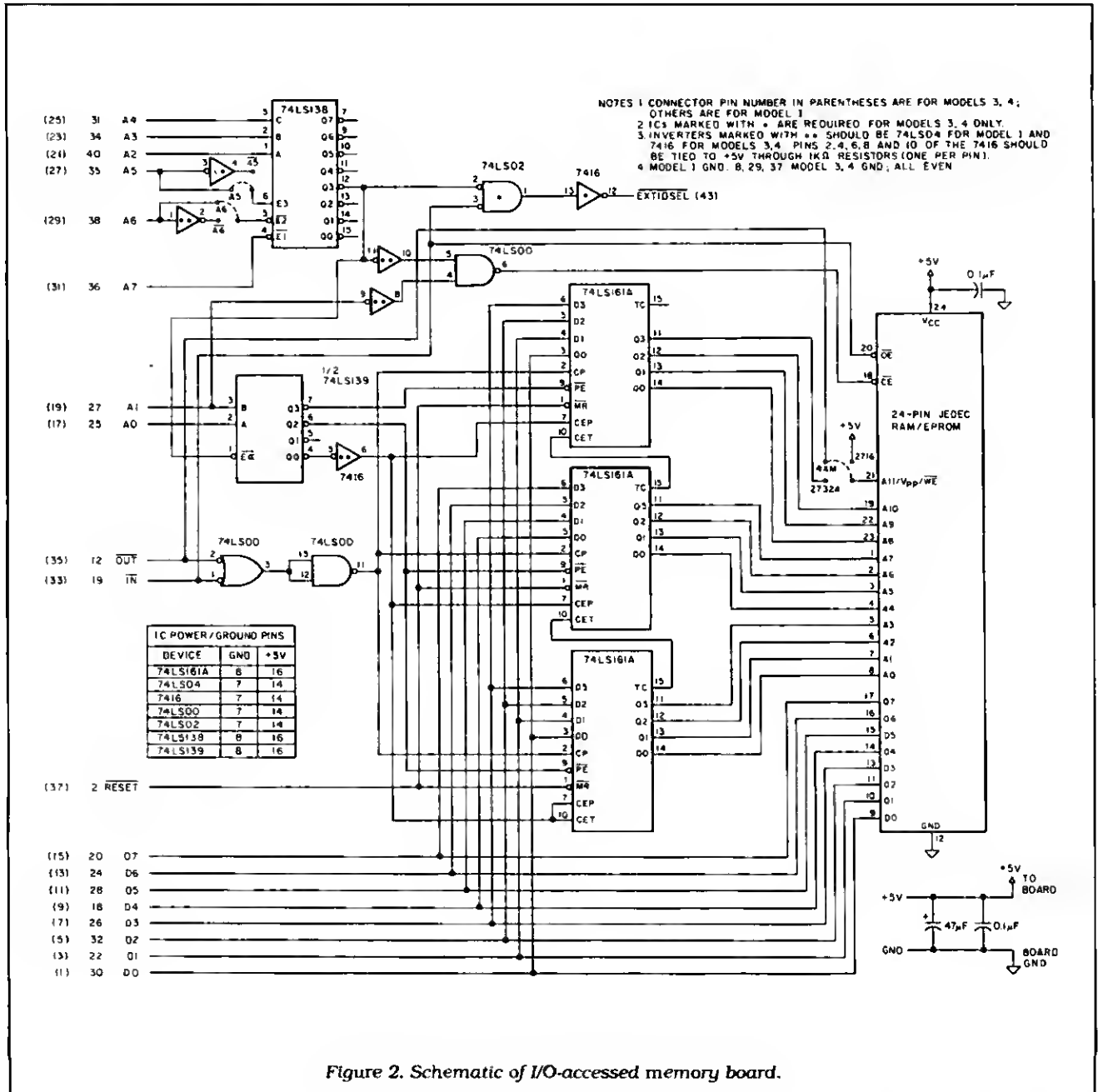
gram). This is a particularly useful board for non-disk users because you can quickly load special routines into memory.

For Assembly-language users, I designed the board to support the Z80's block I/O move instructions: INI, INIR, IND, INDR, OUTI, OTIR, OUTD, and OTDR. Some of these instructions permit a single-instruction block move between the JEDEC memory and the computer's main memory, resulting in a high data-transfer rate.

After building the board, you may want to test it. The Program Listing shows a simple Basic program that performs a memory test on the board (If you use a 2K RAM device). It uses the auto-address-in-

crement capability of the board to step through the JEDEC RAM device, writing a bit pattern into each location. It then starts over to verify that the expected pattern is in each of the 2,048 memory locations. If everything is OK, the test should complete in under 2.5 minutes. If the program finds an error, it displays an error message that includes the RAM address of the error, the expected value, and the value actually read. ■

Write to Roger C. Alford at Washtenaw Digital Systems, P.O. Box 2014, Ann Arbor, MI 48106. Please include a self-addressed, stamped envelope for a reply.



Program Listing. Basic memory test for the JEDEC memory board.

```

2 *****
3 * PROGRAM TO TEST 2K RAM CHIP ON I/O-ACCESSED JEDEC *
4 * DEVICE BOARD. A PATTERN IS WRITTEN TO THE DEVICE, *
5 * THEN IS READ BACK FOR VERIFICATION. *
6 *
7 * WRITTEN BY ROGER C. ALFORO *
8 *****
9
10 CLS : PRINT "WRITING TEST PATTERN TO RAM"
11 OUT 46,0 : OUT 47,0 'SET STARTING RAM ADDR @ 000H
12 FOR I=1 TO 8 'BREAK COUNTING INTO 8 256-BYTE BLOCKS
13 FOR J=1 TO 256 'LOOP COUNTER FOR CURRENT BLOCK
14 B=J+I-1 : IF B>255 THEN B=B-255 'GET TEST PATTERN
15 OUT 44,B 'WRITE THE TEST PATTERN AND INC PTR ADDR
16 NEXT J
17 NEXT I
18 PRINT "CHECKING DATA"
19 OUT 46,0 : OUT 47,0 'SET STARTING RAM ADDR @ 000H
20 FOR I=1 TO 8 'BREAK COUNTING INTO 8 256-BYTE BLOCKS
21 FOR J=1 TO 256 'LOOP COUNTER FOR CURRENT BLOCK
22 B=J+I-1 : IF B>255 THEN B=B-255 'CREATE TEST PATTERN
23 A=INP(44) 'GET RAM VALUE AND INCREMENT PTR ADDRESS
24 IF A=B THEN 170 ELSE PRINT "ERROR (ADDR/EXP/ACT): ";
25 PRINT (I-1)*256+J-1,"/";B,"/";A
26 NEXT J
27 NEXT I
28 PRINT "MEMORY TEST DONE"
29 END

```

End

Hitachi IC Memory Data Book
(describes 6116 RAM and other
JEDEC memory devices):
Hitachi America Ltd.
Semiconductor and IC Sales Division
1800 Bering Drive
San Jose, CA 95112
408-292-6404

Mostek Corporation (Zeropower RAM):
1215 W. Crosby Road
Carrollton, TX 75006.
214-242-0444

Signetics TTL Logic manual 1982
(describes 74161/74LS161A
differences):
Signetics Corporation
811 E. Arques Ave.
P.O. Box 409
Sunnyvale, CA 94086
408-739-7700

Intel Memory Components
Handbooks (JEDEC memory device
data sheets):
Intel Corporation
3065 Bowers Ave.
Santa Clara, CA 95051.
408-987-8080

Figure 3. JEDEC manufacturers and information sources.

Project Corrections For the Models III And 4

In previous projects designed to accommodate the Models III and 4/4P, I included circuitry to generate the EXTIOSEL/ signal as required for those machines.

It has been brought to my attention that I overlooked an important detail in generating the EXTIOSEL/ signal: the Models III and 4/4P have an internal 150-ohm pull-up resistor on the line. While I knew of the pull-up, I didn't know that it had such an unusually low value.

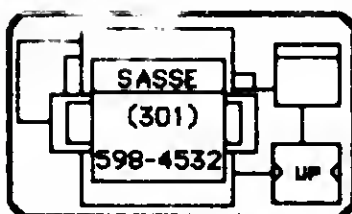
With such a low resistor, the device generating the EXTIOSEL/ signal must be able to sink approximately 30 milliamperes of current. This is more current than LS-TTL devices are designed for, though they will do the job (and have in units that I have built).

Now that I know of this problem, a correction is in order. If you have built Model III or 4/4P boards using an LS-TTL device to generate the EXTIOSEL/ signal, replace the LS device with a standard TTL device (for example, replace a 74LS32 with a 7432).

The standard TTL device is capable of supplying enough current to pull EXTIOSEL/ low without undue stress on the chip. Future projects will incorporate the appropriate current-sinking devices. ■



Circle 350 on Reader Service card.



MEMOIR Model III

Executive Free Form Note Processor

1. Windows
 2. Disk files
 3. Metric chart
 4. Manual on disk
 5. Area code index
 6. Timed Memos
- Just \$39.95 plus \$2.25 P&H

SASSE FREEDOM FILE FILING SYSTEM

SASSE the first full application program designed around the Model III that takes full advantage of the windowing technique. **SASSE** has word-processing & multi-tasking capabilities. It enables the operator to (1) sort, print, edit and search different files simultaneously, (2) call the HELP or OPERATION MANUAL in the midst of an operation; (3) stack 8 windows of various information at one time. \$75.00 plus \$3.25 P&H

THIS OR THAT utility — Now you can run two of your application programs at the same time. \$20.00 + \$1.25 P&H
WINDOWPAD utility — The utility that started it all! Still just \$20.00 + \$1.25 P&H. Call or Write **EN FLEUR CORP.** 2494 SUN VALLEY CIRCLE, SILVER SPRING MD 20906

NEW PRICES!

EDIT

Full-screen Basic editor. On-line, 30+ commands/functions.
Reg \$40 \$20 + \$2 s/h

SBE

Machine-code development system. Upwards compatible with PC version.
Reg \$100 \$50 + \$3 s/h
(PC \$160) (\$90 pr.)

EnBase

Sophisticated relational dbms. Changes structure anytime, no re-blocking. Interfaces with Basic, Scriptit, VisiCalc. Works with HD, Network3.
Reg \$140 \$70 + \$3 s/h

FC

Full-screen all drive directory. A must for HD users.
Reg \$25 \$15 + \$1 s/h

ACCEL3/4

Easy-to-use Basic Compiler, huge speedups (2-200 times), accepts 25k+ programs, handles the whole Basic language.
Reg \$99.95 \$49.95 + \$2 s/h

SuperStep/EMU02

Fascinating Z80/6502 simulators. Terrific fun for learning, debugging.
Reg \$40 ea. \$25 pr. + \$3 s/h

Programs work on TRS-80 Model I/III, MAX-80 (specify which machine), any DOS. CA add 6%

Allen Golder Software

Box 11721 San Francisco, CA 94101 (415) 681-9371

ONE MEGABYTE MEMORY

For Model 1, 3, and 4

Yes! You can now have 1 million bytes of accessible memory in the model 1, 3, and 4. You can now have a memdisk larger than a double side 80 track drive. Price starts at **\$229** for the first **256K** without the memory. Additional memory can be added at any time in 256K increments. Memory is installed inside the computer. Call or write for more details.

SuperRAMDrive—Lets you use the 128K for applications and still use the extra memory for a RAMDISK. 192K for the 256K version or 386K for the 512K version \$49.95.

Other Products

5 MHz Speed-up for Model 4 (\$69.00)	Model 4P (\$79.00)
6MHz Speed-up for New Model 4 and 4P	\$79.95
10 Meg internal hard drive for Tandy 1000	\$699
20 Meg internal hard drive for Tandy 1000	\$999
TEAC 1/2 height, DS 40 track drive	\$115
TEAC 1/2 height, DS 80 track drive	\$135
OKIDATA 92p...	\$384
OKIDATA 84 step 2	\$675
Qume, Juki, Panasonic, Epson, and other printers available	

Write for complete catalog of products.

ALPHA TECHNOLOGY INC.

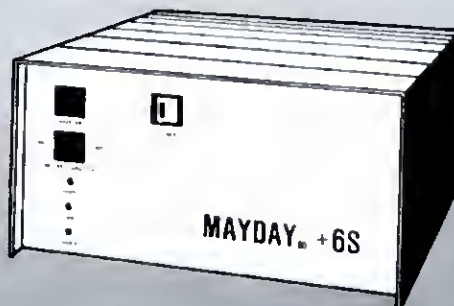
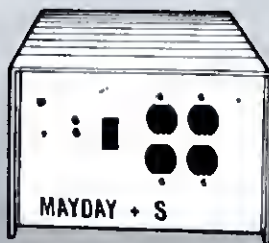
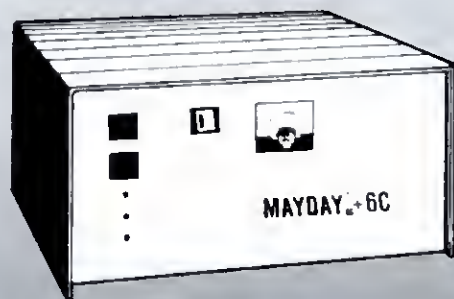
A1A Computer Division
1902 Highway A1A
Indian Harbour Beach FL 32937
(305) 773-2956 11 am-6 pm Mon-Sat
Dealer inquiries invited

Master Card, Visa, Amex, and COD's accepted
Above prices reflect cash discount

Circle 285 on Reader Service card.

UNINTERRUPTIBLE POWER SYSTEMS

By Sun Research



For complete protection from **Blackout, Brownout, Surge and Spike** specify a **MAYDAY Uninterruptible Power System** by **SUN RESEARCH**.

Eliminate costly downtime and lost data caused by these most-misery power losses. Protect your software and hardware from damage caused by sudden drops in line voltage. Isolate your computer system completely from the AC wall circuit with a **MAYDAY** continuous (on-line) Uninterruptible Power System. Give all your components clean 60Hz sine wave

power for optimum performance at a price you can afford.

Available in 100, 200, 300, 400 and 1000 VA capacities.



MAYDAY Division
SUN RESEARCH, INC.
Old Bay Road, Box 810
New Canaan, N.H. 03855
(603) 853-7110

Double-Spaced Out: Tackling Printer Woes

Many new users of Tandy's MS-DOS encounter minor problems with their Epson printers. In particular, they're finding that they're getting unwanted line feeds. I've spent some time walking through the forest of printer compatibility, and have managed to clear some of the underbrush. Here's a summary of what your Tandy and Epson might be doing, along with a set of problem-solving guidelines.

If you experience similar problems with a non-Epson printer, read on; some of this information might still apply to you.

Tandy software sends control code 13 (0D hexadecimal [hex]) to Tandy printers to start a new line. Tandy calls the resulting carriage return/line feed New Line, even though 13 is the ASCII code for Carriage Return (CR) only. Other micro manufacturers, including IBM, use control code 13 followed by 10 (Line Feed [LF]) to start a new text line. The Tandy 1000 and 1200 also use this combination for IBM compatibility.

An IBM PC-compatible printer responds to codes 13 and 10 first with a carriage return to the left margin, then with a line feed to the new line.

Some printers (my Okidata, for example) may also respond to code 10 alone with a CR/LF. A printer set for auto line-feed—to use with a Model 4, for example—responds to the 13/10 combo with two line feeds. That's why you might get unwanted double-spacing with your 1000.

You can set the newer Tandy printers and most other printers to respond to code 13 with either CR or CR/LF using DIP switches. Some printers also provide a switch for true Line Feed, instead of CR/LF.

If you often move between TRSDOS and MS-DOS, leave your printer set for auto line-feed. The 1000 has a software solution for the extra line feed: the Mode command's LF option. Typing in LF,

System Requirements

Models 1000, 1200, and 2000
GW-Basic



then MODE LFOFF, from DOS usually eliminates unwanted double-spacing by controlling the DOS printer-driver routine. Invoke LPINST from DOS to put that command sequence in your AUTOEXEC batch file permanently, so that the computer modifies the printer driver every time you boot from that disk.

To examine the workings of the MODE LFOFF option, I wrote a small machine-language routine that sends various combinations of the CR and LF codes mixed in with text characters. (I first tried Basic, but CHR\$(10) and CHR\$(13)

both invoke a CR/LF when put in LPRINT statements.) I found that the LFOFF option strips out any code 10 that immediately follows a 13. If your printer is then set for auto line-feed, 13/10 triggers only one line feed, because the computer ignores the trailing LF. The code sequence 13/10/10 produces two line feeds because the machine strips out only the first LF code. But if an LF precedes a CR (10/13), you'll get two line feeds.

Epson printers (and their clones) generate extra line feeds in still another way. Printer connector pin 14 is labelled

Program Listing. Subroutine for checking printer port status.

```
1000 REM Subroutine checks printer port for status. If you have a
1010 REM multi-function board with additional printer ports, change the
1020 REM value for the variable PRINTER when changing ports. For
1030 REM example,
1030 REM when checking LPT2:, assign PRINTER=2.
2000 PRINTER=1:DEF SEG=&H40:PRINTPORT = (PRINTER * 2) + 6
2010 IF PEEK(PRINTPORT) = 0 THEN PRINT "Tandy 1000 printer
interface circuitry not working.":RETURN
2020 STATUS=INP(PEEK(PRINTPORT) + PEEK(PRINTPORT + 1) * 256 + 1)
2030 IF STATUS = 223 THEN PRINT "Printer ready."
2040 IF STATUS = 207 THEN PRINT "Printer not ready."
2050 IF STATUS = 79 THEN PRINT "Out of paper."
2060 IF STATUS = 95 THEN PRINT "Printer not on."
2070 RETURN
```

End

AUTO FEED XT. A low signal on line 14 causes automatic line feeds after carriage returns, regardless of any DIP switch settings. The signal overrides the DIP switch for auto line-feed. It just so happens that Tandy computers (and printers) ground line 14, providing a persistent double-spacing with Epson printers unless you cut line 14 on the printer cable. The person I spoke to at Epson suggested cutting line 14 at the printer end of the cable in case the signal doesn't originate from 14 at the computer end.

Line 14 isn't necessary for Epson operation; you can still get auto line-feed by setting the DIP switch.

Working with the information above, you can use the following logical steps to eliminate unwanted double-spacing.

- Check for a DIP switch on your printer that turns auto line-feed off.
- If you have an Epson printer, the DIP switch 2-3 won't work unless you cut line 14. Make sure it's line 14 from the printer's point of view. On my cable that's the eighth wire from the uncolored edge. Note that my instructions for cutting the wire in "The Tandy 1000 Tip Sheet" (June 1985, p. 38) were incorrect.
- If your printer doesn't have a DIP switch or you don't want to change it and you have a 1000, use LFCOM and MODE LFOFF from DOS (or LPIINST; see p. 7 of DeskMate tutorial).

If you have a 1200 and want to use it with an older Radio Shack printer without DIP switches for AUTO LINE-FEED, Larry Boxx of Fort Lauderdale, FL, offers a solution. He reports that Radio Shack Service Centers can modify some printers (e.g., the LP-III and DW 2B) so they don't respond to code 13 with automatic LF.

Printer problems have still other, less likely, causes. Some software inserts itself into the printing process at a level lower than the Mode command, bypassing its effects. PC-DOS's Graphics.COM, for instance, intercepts the low-level print-screen interrupt. The only solution in a case like this might be to modify the software (see the patch in "The Tandy 1000 Tip Sheet"). Printer-switching boxes can also affect what gets to the printer, either causing problems or, in one case I've heard of, solving them.

If you own one of the early 1000s, and any of the PFS software series tells you your printer isn't ready when it is, you need a modification to your 1000's printer port. Most 1000s had the fix at manufacture.

The Bottom Line

The 25th screen-line problem I mentioned in my June article brought in several letters. All corrected my assertion that Locate doesn't work on the bottom line. If you've removed the function key

display with Key Off, you can locate the cursor on the 25th line just like any other line. A simple `PRINT STRING$(40,32)` quickly clears the 25th line in the 40-column screen modes, as does `PRINT STRING$(80," ")` in an 80-column mode. If you try `Locate 25,1` with the function key assignments displayed, an "Illegal Function Call" message will zap you. I should have consulted the IBM Basic manual on this matter. All the details are laid out in two pages. The Tandy manual simply states that the legal row range for `Locate` is 1-24.

Chan Shippy of Colome, SD, has laid the matter to rest: `KEY OFF : VIEW PRINT 1 TO 25`. "You can now use `Locate 25` and graphics statements in any screen mode, and CLS will clear all 25 lines." I tried it in all modes and I'm convinced there's no better way (see "Sifting Through GW-Basic," August 1985, p. 46).

Status Symbol

From Charlie Milhans (stationed in the Pacific) comes the Program Listing, a Basic subroutine for the 1000 that returns your printer status. Line 2000 changes the bottom of Basic's data segment to 40 hex. (The 64K memory block addressed by `POKE` and `PEEK` will now start at absolute address 400 hex.) Segment 40 hex is the start of the ROM BIOS data area, where the computer stores all sorts of useful information for the BIOS and DOS to use. If you're using the normal printer port (`PRINTER = 1`), then the program assigns value 8 to variable `PRINTPORT`. The 2 bytes at offset 8 in the BIOS data area contain the port address for your printer (`LPT1`). Line 2010 checks that this address isn't zero, which would indicate severe problems with the printer interface circuitry.

Line 2020 turns that 2-byte hex port address into a decimal value for the `INP` statement (with the least-significant byte first). The value the `INP` statement returns from that port is the printer status. Milhans found the values returned in lines 2030-2065 indicated the conditions printed by the appropriate Print statements. My Okidata 82A returns 95 when the printer is off (and when it is not ready), 119 when it is out of paper, and 207 when it is ready. The 8088 can only believe what the printer tells it, so you might have to figure out the error codes for your printer. I inserted a line 2065 `PRINT STATUS` to see what was coming back from that port.

The meaning of the returned value is determined as follows, according to the 1000 Software Developer's Guide:

- bit 0 = timeout occurred
- bit 1 = (unused)
- bit 2 = (unused)
- bit 3 = I/O error
- bit 4 = selected

- bit 5 = out of paper
- bit 6 = acknowledge
- bit 7 = not busy

I assume that these bit assignments are standard for Tandy printers.

Drive Woes

TNT Software's Bruce Tonkin, author of *The Creator* and *My Word!*, has a woe-ful tale of worn drives. He bought two 1000s for software development, and was using them to copy a large number of disks. The Teac drives in both machines wore out after formatting 700 disks (more or less). That's a lot of formatting, but no more than the average Model 1000 owner might do during the life of his machine. The drives would still format some brands of disks, but not others. The local Tandy store replaced the Tandy drives.

Vincent Meyer of the Micro Clinic Service Network in New York state diagnosed the problem (over the phone) as worn heads. The signal picked up from the disk or head amplitude was starting to fall off, and results varied with the disk brand because of differences in their magnetic qualities. Sooner or later no disk will format properly. Meyer was not surprised, calling the Teacs "cheap, but adequate."

Tandy considers the drives "high quality," but price is also a consideration, according to Amy Arutt, public relations spokesperson for Tandy's MS-DOS line. If this turns out to be a real problem, you'd better follow Meyer's advice on drive care religiously ("Drive Ways," September 1984, p. 42). Garbage diskettes (improperly burnished) and "cleaning" diskettes will increase head wear.

Assemble This

Once converted from quad density to 1000 disk format (with IBM PC Maker), Tandy's MS-Assembler for the 2000 seems to work fine on the 1000 (and on the IBM PC for that matter). It's advertised in the catalog for all Tandy MS-DOS micros. I haven't tried conditional assembly or macros yet, but I've put together an 8K program with nine modules, using the assembler and the 1000 DOS's linker (`LINK.EXE`) without a bug.

Ken Shea of Lexington, OH, points out that you can modify machine-language files with the .EXE extension by renaming them with a different extension. So you can patch `DeskMate.EXE` to run on the 1200 with `Debug` (see "The Tandy 1000 Tip Sheet"). Modify the renamed program with `Debug`, then replace the file extension with the original EXE. ■

You can write to Dave Rowell at 80 Micro, 80 Pine St., Peterborough, NH 03458.

SAVE A BUNDLE

WITH ONE OF
OUR BUNDLES

We have put together special bundles of software just in time to save you a bundle of money. Didn't you ever wonder why CP/M was so popular? The reason is the software availability. All programs (except EP) are for the Model 4/4P and have been optimized to install and run without hassle. For example, we have memory-mapped WordStar® and it runs circles around the standard version available elsewhere. We also added printer drivers for the Daisywheel II and the DMP-2100. Our CP/M® 2.2 is the best around. Read the reviews. You *know* the programs. You *know* the prices. This is the years' best value. You owe it to yourself to let these CP/M® programs and thousands of others (many in the public domain) start serving your needs.

Bundle #1

WordStar®
MailMerge®
SpellStar™
StarIndex™
Montezuma Micro CP/M®

\$299
Delivered

RETAIL VALUE \$1009

Bundle #5

Electric Pencil™
Red Pencil™
Blue Pencil™

\$149
Delivered

Works with TRS80S, NEWDOS-80,
DOSPLUS and MULTIDOS
(Model 1,3,4)
RETAIL VALUE \$240

Bundle #2

WordStar®
DataStar™
ReportStar™
CalcStar™
Montezuma Micro CP/M®

\$399
Delivered

RETAIL VALUE \$1354

Bundle #3

WordStar®
MailMerge®
SpellStar™
StarIndex™
DataStar™
ReportStar™
CalcStar™
Montezuma Micro CP/M®

\$499
Delivered

RETAIL VALUE \$1699

Bundle #4

WordStar®
MailMerge™
SpellStar™
StarIndex™
dBASE II®
TurboPascal™
Montezuma Micro CP/M®

\$599
Delivered

RETAIL VALUE \$1553

Save A Bundle on these books and disks

Take advantage of our volume discounts. Buy any three items from this list and deduct \$5 from your total order. Buy four...deduct \$10. Buy five...deduct \$15. Buy six...deduct \$20 and so on. Buy a bunch, save a bundle. Please add \$1 each for shipping. Add \$5 to orders under \$50 for handling.



TRS-80 Disk & Other Mysteries. The "How to" book of data recovery for the TRS-80 Model I disk operating system. 128 pages. Retail \$22.50 **Now \$18**

Microsoft BASIC Decoded & Other Mysteries. The complete guide to Level II and BASIC. 312 pages. Retail \$29.95 **Now \$24**

The Custom TRS-80 & Other Mysteries. The complete guide to customizing TRS-80 Hardware and Software. 336 pages. Retail \$29.95 **Now \$24**

BASIC Faster & Better & Other Mysteries. The complete guide to BASIC programming tricks and techniques. 290 pages. Retail \$29.95 **Now \$24**

BASIC Faster & Better Library Disk. Contains 121 functions, subroutines and user routines. Search merge, compare and listing routines plus array handlers, BASIC overlays and video drivers. Retail \$19.95 **Now \$18**

BASIC Faster & Better Demonstration Disk. Contains 32 demos of the Library Disk contents above. Retail \$19.95 **Now \$24**

BASIC Disk I/O Faster & Better & Other Mysteries. Programming tips and techniques to store/retrieve data from disk. 432 pages. Retail \$29.95 **Now \$24**

BASIC Disk I/O Faster & Better Demonstration Disk. All of the major demo programs and library of disk I/O subroutines in 25 BASIC programs. Random, Indexed Sequential and TREESAM file handlers included. Retail \$29.95 **Now \$24**

Machine Language Disk I/O & Other Mysteries. A guide to machine language disk I/O for the TRS-80. 288 pages. Retail \$29.95 **Now \$24**

TRSDOS 2.3 Decoded & Other Mysteries. Detailed explanation of the Model I disk operating system. 298 pages. Retail \$29.95 **Now \$24**

How To Do It On The TRS-80. A complete applications guide to the TRS-80 Model I, II, III, 100, and Color Computer. 352 pages. Retail \$29.95 **Now \$24**

The Custom Apple & Other Mysteries. Who cares? Retail \$29.95 **Now \$18**

Due to the nature of this business, there are **NO REFUNDS** on software. We accept American Express, MasterCard, Visa and CDD. Your card is not charged until we ship your order. Personal and company checks are accepted without delay (call for details). Delivered prices are for the lower 48 States only. Prices and specifications subject to change without notice. If you don't understand any of this, just give us a call and we will take the time to explain it until you do. First-timers are always welcome here.

©1984 by Montezuma Micro. WordStar®, SpellStar™, StarIndex™, MailMerge®, DataStar™, ReportStar™ and CalcStar™ belong to MicroPro® International Corporation. CP/M® belongs to Digital Research Inc. dBASE II® belongs to Ashton-Tate, Inc. All the Pencils™ belong to Michael Shroyer. Turbo Pascal™ belongs to Borland International.



**MONTEZUMA
MICRO**

214-339-5104
Redbird Airport, Hangar #8
P.O. Box 32027
Dallas, Texas 75232 "WE KEEP YOU RUNNING"



ORDER NOW... TOLL FREE

800-527-0347

800-442-1310

The Toll Free lines are for orders only.
Specifications subject to change without notice.



MONTESUMA'S REVENGE

P.O. Box 2169
Camp Verde (Lizard Flats)
Arizona 86322

"WE KEEP YOU RUNNING"

COMPUTERS

25-1000	100 Model 1000 128K RAM IBM Clone	\$1025
25-1069	25 Model 4 64K RS232C Purity Radio Shack	999
25-1080	64K Model 4 64K RS232C Purity Radio Shack	899
25-3127	64K Extended BASIC Computer 2	179
25-3134	18K Color Computer 2	99
25-3135	18K Extended BASIC Computer 2	99
25-3589	Pocket Computer 3 with 4K RAM	65
25-3601	Pocket Computer 4	59
25-3801	Model 100 Portable Computer	89
25-3802	Model 100 24K Portable Computer	539
25-4004	Model 12 1-Drive	2199
25-5103	Model 2000 256K 128K	2201
25-5104	Model 2000 256K Disk and 256K	3358
25-6021	Model 6000 20 512K	3824
25-6022	Model 6000 HD 512K	4674
25-6050	DI-1 Terminal	459
25-6052	DI-100 Terminal	675

MODEMS

25-1000	Model 1000 100 Modem	153
25-1094	Model 49 Modem Board	\$127
25-1173	DC Modem	169
25-1174	Acoustic Coupler Modem	127
25-1175	DC Modem 1B	86
25-1176	DC-2112 High Speed Modem	339
Anchor Mark 1	Modem 300 Baud with cable	74
Anchor 300/700	Baud Modem with cable & PS	239
Haves Smartmodem	200 Baud	233
Haves Smartmodem	1200 Baud	325

PERIPHERALS

25-1000	20r cabinet w/ half drives	449
12" Green	Non-Glare Video Monitor	79
12" Amber	Non-Glare Video Monitor	79
Video card	Model 1 keyboard-to-monitor	15
25-1010	Model 1000 Mouse & Clock/Calendar	85
25-3010	VMS-3 Model 1200 Monochrome Monitor	159
25-3040	Model 1200 Monochrome Monitor	159
25-3043	Model 1200 Graphics Display Adapter	229
25-3044	Model 1200 Technical Graphics Master	499
25-0511	Genuine RS Parity/Bus Anti-Glare Display	14
25-1085	Model 49 Carrying Case	21
25-1131	Model 1/3 1/4 5MB Hard Disk Secondary	1299
25-1132	Model 3 15MB Hard Disk Int'l Kit	98
25-1134	Model 4 15MB Hard Disk Int'l Kit	98
25-1183	Model 100 Bar Code Reader	85
25-1185	Model Computer Mouse Pad	69
25-1187	Model for Model 200	85
25-1196	Serial to Parallel Converter	85
25-1208	CCR-81 Cassette Tape Recorder	51
25-1209	CCR-82 Cassette Tape Recorder	51
25-1326	Anti-Glare Panel, Model 212/16	42
25-1342	Clear Keyboard for Model 3/4	11
25-1410	Model 100 Modem Cable	11
25-1426	Automatic Power Strip/Surge Protector	59
25-1451	Non-Automatic Power Strip/Filter	42
25-1457	Anti-Glare Panel, Model 1/3/4	42
25-2228	Color Computer Deluxe RS-232C Kit	42
25-3007	Color Computer Carrying Case	17
25-3008	Color Computer Joystick, Per Pair	21
25-3012	Color Computer Deluxe Joystick/Track	39
25-3023	Color Computer 1/2 Disk Drive 1/2 or 3	64
25-3024	Color Computer Multi-Pak Interface	64
25-3025	Color Computer Mouse	13
25-3033	PC 1 Carrying Case	13
25-3038	PC 1 Carrying Case	13
25-3068	PC 2 Carrying Case	25
25-3612	RS-232C Interface	89
25-3613	PC 4K RAM Module	118
25-3616	PC 2 8K RAM Module	118
25-3651	PC 4 Carrying Case	13
25-3653	PC 4 Carrying Case	13
25-3654	PC 4 Carrying Case	13
25-3604	Model 100 AC Adapter	6
25-3605	Model 100 Acoustic Coupler	34
25-3609	Model 100 Carrying Case	34
25-3611	Model 100 Soft Carrying Case	42
25-3612	Model 100 Legs (Pair)	42
25-4154	Model 121185 Intel 15MB Hard Disk Kit	2245
25-4155	Model 2314/1216 15MB Primary Hard Disk	1695
25-4156	Model 2314/1216 15MB Secondary Drive	1271
25-4157	Model 21216 Installation Kit for 25-4155	231
25-5111	Model 2000 VML-1 Monochrome Monitor	169
25-5112	Model 2000 DMI-1 Color Monitor	352

FURNITURE

25-1305	Model 3/4 System Desk	\$152
25-1308	Universal Printer Stand	45
25-1324	Computer Table	68
25-1354	NEWM Computer Stand	42
25-1355	NEWM Printer Stand	42
25-1356	NEWM System Desk	102
25-1357	NEWM Printer Stand	102
25-1358	NEWM Corner for 1356/57 Desk/Stand	42
25-1359	NEWM Hutch for 1355 Desk	51
25-1366	NEWM Printer Platform	35
25-4303	Deluxe System Desk	169
25-4305	Deluxe Printer Stand	129
25-4308	Terminal Stand	168
25-4307	Printer Stand	128
25-5115	Model 2000 Pedestal	76
25-5116	Model 2000 Floor Stand	123

PRINTERS & ACCESSORIES

25-1192	GP-115 Color Graphics Printer	169
25-1196	GP-115 Graphics Pad	169
25-1250	DWP-410 Daisywheel Printer	583
25-1252	DWP-400 220cps Printer	1099
25-1254	DWP-200 220cps Printer	424
25-1256	DWP-120 120cps Printer	424
25-1257	DWP-210 210cps Printer	809
25-1261	PT-10 Thermal Matrix Printer	35
25-1268	GP-220 220cps Printer	169
25-1269	PTC-64 64K Printer Controller (Buffer)	212
25-1270	DWP-510 Daisywheel Printer	1270
25-1271	DWP-110 110cps Printer	339
25-1274	DWP-210P 210cps Dual Mode Printer	1695
25-1275	NEWM TRP-100 Printer	255
25-1276	DWP-105 New Cheapest Printer	169
25-1277	DWP-430 New Hot Cheap Printer	769
25-1441	B-Directional Tractor for DWP-210	144
25-1443	B-Directional Tractor for DWP-210	99
25-1447	B-Directional Tractor for DWP-210	99
25-1448	Single Bin Sheet Feeder for Daisywheel	672
25-1455	Acoustic Cover	339
25-1459	B-Directional Tractor for DWP-410	169
25-1461	Model 1/3 1/4 Printer Cable	23
25-1468	RS-232C Cable	16
25-1469	Model 100 Printer Cable	13
25-4401	Model 2116/2000 Printer Cable	169
25-1490	10 RS-232C Cable	25
25-1491	25 RS-232C Cable	33
25-1492	50 RS-232C Cable	33
25-1493	100 RS-232C Cable	75
25-1495	RS-232C Cable Extender	25
25-1496	RS-232C New Modern Adapter	25
25-1497	SW-302 Per Printer Switch	126
25-1499	SW-303 RS-232C Selector Switch	126
25-3591	PC 3 Printer	85
25-3592	PC 2 Printer	85
25-3593	PC 1 Printer	85

C.I.TOH

3520	350cps Parallel IBM Compatible	1995
8510BP	120cps Friction/Tractor Parallel IBM Comp	\$349
8510GP	Hot Dot 180cps Rear Feed	495
8510SCP	Color High Speed printer	549
1550P	Printer 2 120cps for Wide Paper Parallel	525
1550GP	Hot Dot 180cps Rear Feed & Wide	675
F10-40	Starliner 60cps Daisywheel	899
F10-55	Printermaster 35cps Daisywheel FAST	1099
F10	B-Directional Tractor with Plastic Cover	210
F10	Each Single Bin Sheet Feeder Inst. Required	775
G1-100	Mechanical Single Bin Sheet Feeder	499
G1-100	Gamma Binaries 50cps	139

We have just covered for most every printer we sell. Be sure to order one with your new printer to keep it neat and clean.

CABLES

We manufacture a great number of different cable assemblies to connect most anything to anything else. Call us with your specific needs. We probably have it on the shelf. All at discount prices, of course.

SUPPLIES

5.25	5.25 Diskettes, Pack of 10, 1 Year Guarantee	\$15
5.25	5.25 Diskettes, Pack of 10, 1 Year Guarantee	19
8	5.25 Diskettes, Pack of 10, 1 Year Guarantee	29
6	5.25 Diskettes, Pack of 10, 1 Year Guarantee	34
8.5	11" Tractor Paper 200 2900 Sheets	25
14	11" Tractor Paper 200 2900 Sheets	35
5.25	or 8 Head Cleaning Kit	9

RIBBONS

We have more ribbons than you do. Way too many types to list here. Add them to your order now. They're cheap too.

MONTESUMA'S REVENGE

MODEL 3 UPGRADE

112K - CP/M - 80 COLUMN

This month Montezuma's offers the deal of the year. The Holmes VID-80 is the only plug in printed circuit board which expands the Mod 3 display to 24 lines of 80 characters and allows operation of the CP/M 2.2 operating system with a 54K TPA. Both 80 & 24 and 84 & 140 modes are available from TRSDOS and BASIC. Reads and writes 14 different disk formats (Kaypro, Osborne, etc.). A total of 112K of RAM. The extra 8K RAM can be set up as a RAM disk through software routines that are furnished with the supplied CP/M 2.2 operating system. The VID-80 comes complete with easy to follow installation instructions and operational documentation. No trace cuts or soldering required. Guaranteed for one year parts and labor. Money can ship this today.

MONTESUMA'S SPECIAL PRICE \$279

Add WordStar 3.3 ready to run for \$190

"WE KEEP YOU RUNNING"

SOFTWARE

Note: It is Radio Shack policy that not all multi-purpose software packages contain disks for all modes. Optional disks are available at slight extra charge. Be sure to ask for details when you order.

NEWM CP/M 2.2	by Montezuma's Micro For The Model 4	169
NEWM CP/M 2.2	by Montezuma's Micro For The Model 4	169
25-6210	TRSDOS 2.3 For The Model 4	12
25-6212	TRSDOS 1.3 For The Model 4	12
25-6013	TRSDOS 6.5 For The Model 4	12
25-6015	TRSDOS 6.5 For The Model 4	12
25-6016	TRSDOS 6.5 For The Model 4	12
25-6017	TRSDOS 6.5 For The Model 4	12
25-6018	TRSDOS 6.5 For The Model 4	12
25-6019	TRSDOS 6.5 For The Model 4	12
25-6020	TRSDOS 6.5 For The Model 4	12
25-6021	TRSDOS 6.5 For The Model 4	12
25-6022	TRSDOS 6.5 For The Model 4	12
25-6023	TRSDOS 6.5 For The Model 4	12
25-6024	TRSDOS 6.5 For The Model 4	12
25-6025	TRSDOS 6.5 For The Model 4	12
25-6026	TRSDOS 6.5 For The Model 4	12
25-6027	TRSDOS 6.5 For The Model 4	12
25-6028	TRSDOS 6.5 For The Model 4	12
25-6029	TRSDOS 6.5 For The Model 4	12
25-6030	TRSDOS 6.5 For The Model 4	12
25-6031	TRSDOS 6.5 For The Model 4	12
25-6032	TRSDOS 6.5 For The Model 4	12
25-6033	TRSDOS 6.5 For The Model 4	12
25-6034	TRSDOS 6.5 For The Model 4	12
25-6035	TRSDOS 6.5 For The Model 4	12
25-6036	TRSDOS 6.5 For The Model 4	12
25-6037	TRSDOS 6.5 For The Model 4	12
25-6038	TRSDOS 6.5 For The Model 4	12
25-6039	TRSDOS 6.5 For The Model 4	12
25-6040	TRSDOS 6.5 For The Model 4	12
25-6041	TRSDOS 6.5 For The Model 4	12
25-6042	TRSDOS 6.5 For The Model 4	12
25-6043	TRSDOS 6.5 For The Model 4	12
25-6044	TRSDOS 6.5 For The Model 4	12
25-6045	TRSDOS 6.5 For The Model 4	12
25-6046	TRSDOS 6.5 For The Model 4	12
25-6047	TRSDOS 6.5 For The Model 4	12
25-6048	TRSDOS 6.5 For The Model 4	12
25-6049	TRSDOS 6.5 For The Model 4	12
25-6050	TRSDOS 6.5 For The Model 4	12
25-6051	TRSDOS 6.5 For The Model 4	12
25-6052	TRSDOS 6.5 For The Model 4	12
25-6053	TRSDOS 6.5 For The Model 4	12
25-6054	TRSDOS 6.5 For The Model 4	12
25-6055	TRSDOS 6.5 For The Model 4	12
25-6056	TRSDOS 6.5 For The Model 4	12
25-6057	TRSDOS 6.5 For The Model 4	12
25-6058	TRSDOS 6.5 For The Model 4	12
25-6059	TRSDOS 6.5 For The Model 4	12
25-6060	TRSDOS 6.5 For The Model 4	12
25-6061	TRSDOS 6.5 For The Model 4	12
25-6062	TRSDOS 6.5 For The Model 4	12
25-6063	TRSDOS 6.5 For The Model 4	12
25-6064	TRSDOS 6.5 For The Model 4	12
25-6065	TRSDOS 6.5 For The Model 4	12
25-6066	TRSDOS 6.5 For The Model 4	12
25-6067	TRSDOS 6.5 For The Model 4	12
25-6068	TRSDOS 6.5 For The Model 4	12
25-6069	TRSDOS 6.5 For The Model 4	12
25-6070	TRSDOS 6.5 For The Model 4	12
25-6071	TRSDOS 6.5 For The Model 4	12
25-6072	TRSDOS 6.5 For The Model 4	12
25-6073	TRSDOS 6.5 For The Model 4	12
25-6074	TRSDOS 6.5 For The Model 4	12
25-6075	TRSDOS 6.5 For The Model 4	12
25-6076	TRSDOS 6.5 For The Model 4	12
25-6077	TRSDOS 6.5 For The Model 4	12
25-6078	TRSDOS 6.5 For The Model 4	12
25-6079	TRSDOS 6.5 For The Model 4	12
25-6080	TRSDOS 6.5 For The Model 4	12
25-6081	TRSDOS 6.5 For The Model 4	12
25-6082	TRSDOS 6.5 For The Model 4	12
25-6083	TRSDOS 6.5 For The Model 4	12
25-6084	TRSDOS 6.5 For The Model 4	12
25-6085	TRSDOS 6.5 For The Model 4	12
25-6086	TRSDOS 6.5 For The Model 4	12
25-6087	TRSDOS 6.5 For The Model 4	12
25-6088	TRSDOS 6.5 For The Model 4	12
25-6089	TRSDOS 6.5 For The Model 4	12
25-6090	TRSDOS 6.5 For The Model 4	12
25-6091	TRSDOS 6.5 For The Model 4	12
25-6092	TRSDOS 6.5 For The Model 4	12
25-6093	TRSDOS 6.5 For The Model 4	12
25-6094	TRSDOS 6.5 For The Model 4	12
25-6095	TRSDOS 6.5 For The Model 4	12
25-6096	TRSDOS 6.5 For The Model 4	12
25-6097	TRSDOS 6.5 For The Model 4	12
25-6098	TRSDOS 6.5 For The Model 4	12
25-6099	TRSDOS 6.5 For The Model 4	12
25-6100	TRSDOS 6.5 For The Model 4	12

25-1594	Model 3 Desktop Plan 80
25-1595	Model 3 Desktop Plan 80
25-1596	Model 3 Desktop Plan 80
25-1597	Model 3 Desktop Plan 80
25-1598	Model 3 Desktop Plan 80
25-1599	Model 3 Desktop Plan 80
25-1600	Model 3 Desktop Plan 80
25-1601	Model 3 Desktop Plan 80
25-1602	Model 3 Desktop Plan 80
25-1603	Model 3 Desktop Plan 80
25-1604	Model 3 Desktop Plan 80
25-1605	Model 3 Desktop Plan 80
25-1606	Model 3 Desktop Plan 80
25-1607	Model 3 Desktop Plan 80
25-1608	Model 3 Desktop Plan 80
25-1609	Model 3 Desktop Plan 80
25-1610	Model 3 Desktop Plan 80
25-1611	Model 3 Desktop Plan 80
25-1612	Model 3 Desktop Plan 80
25-1613	Model 3 Desktop Plan 80
25-1614	Model 3 Desktop Plan 80
25-1615	Model 3 Desktop Plan 80
25-1616	Model 3 Desktop Plan 80
25-1617	Model 3 Desktop Plan 80
25-1618	Model 3 Desktop Plan 80
25-1619	Model 3 Desktop Plan 80
25-1620	Model 3 Desktop Plan 80
25-1621	Model 3 Desktop Plan 80
25-1622	Model 3 Desktop Plan 80
25-1623	Model 3 Desktop Plan 80
25-1624	Model 3 Desktop Plan 80
25-1625	Model 3 Desktop Plan 80
25-1626	Model 3 Desktop Plan 80
25-1627	Model 3 Desktop Plan 80
25-1628	Model 3 Desktop Plan 80
25-1629	Model 3 Desktop Plan 80
25-1630	Model 3 Desktop Plan 80
25-1631	Model 3 Desktop Plan 80
25-1632	Model 3 Desktop Plan 80
25-1633	Model 3 Desktop Plan 80
25-1634	Model 3 Desktop Plan 80
25-1635	Model 3 Desktop Plan 80
25-1636	Model 3 Desktop Plan 80
25-1637	Model 3 Desktop Plan 80
25-1638	Model 3 Desktop Plan 80
25-1639	Model 3 Desktop Plan 80
25-1640	Model 3 Desktop Plan 80
25-1641	Model 3 Desktop Plan 80
25-1642	Model 3 Desktop Plan 80
25-1643	Model 3 Desktop Plan 80
25-1644	Model 3 Desktop Plan 80
25-1645	Model 3 Desktop Plan 80
25-1646	Model 3 Desktop Plan 80
25-1647	Model 3 Desktop Plan 80
25-1648	Model 3 Desktop Plan 80
25-1649	Model 3 Desktop Plan 80
25-1650	Model 3 Desktop Plan 80
25-1651	Model 3 Desktop Plan 80
25-1652	Model 3 Desktop Plan 80
25-1653	Model 3 Desktop Plan 80
25-1654	Model 3 Desktop Plan 80
25-1655	Model 3 Desktop Plan 80
25-1656	Model 3 Desktop Plan 80
25-1657	Model 3 Desktop Plan 80
25-1658	Model 3 Desktop Plan 80
25-1659	Model 3 Desktop Plan 80
25-1660	Model 3 Desktop Plan 80
25-1661	Model 3 Desktop Plan 80
25-1662	Model 3 Desktop Plan 80
25-1663	Model 3 Desktop Plan 80
25-1664	Model 3 Desktop Plan 80
25-1665	Model 3 Desktop Plan 80
25-1666	Model 3 Desktop Plan 80
25-1667	Model 3 Desktop Plan 80
25-1668	Model 3 Desktop Plan 80
25-1669	Model 3 Desktop Plan 80
25-1670	Model 3 Desktop Plan 80
25-1671	Model 3 Desktop Plan 80
25-1672	Model 3 Desktop Plan 80
25-1673	Model 3 Desktop Plan 80
25-1674	Model 3 Desktop Plan 80
25-1675	Model 3 Desktop Plan 80
25-1676	Model 3 Desktop Plan 80
25-1677	Model 3 Desktop Plan 80
25-1678	Model 3 Desktop Plan 80
25-1679	Model 3 Desktop Plan 80
25-1680	Model 3 Desktop Plan 80
25-1681	Model 3 Desktop Plan 80
25-1682	Model 3 Desktop Plan 80
25-1683	Model 3 Desktop Plan 80
25-1684	Model 3 Desktop Plan 80
25-1685	Model 3 Desktop Plan 80
25-1686	Model 3 Desktop Plan 80
25-1687	Model 3 Desktop Plan 80
25-1688	Model 3 Desktop Plan 80
25-1689	Model 3 Desktop Plan 80
25-1690	Model 3 Desktop Plan 80
25-1691	Model 3 Desktop Plan 80
25-1692	Model 3 Desktop Plan 80
25-1693	Model 3 Desktop Plan 80
25-1694	Model 3 Desktop Plan 80
25-1695	Model 3 Desktop Plan 80
25-1696	Model 3 Desktop Plan 80
25-1697	Model 3 Desktop Plan 80
25-1698	Model 3 Desktop Plan 80
25-1699	Model 3 Desktop Plan 80
25-1700	Model 3 Desktop Plan 80
25-1701	Model 3 Desktop Plan 80
25-1702	Model 3 Desktop Plan 80
25-1703	Model 3 Desktop Plan 80
25-1704	Model 3 Desktop Plan 80
25-1705	Model 3 Desktop Plan 80
25-1706	Model 3 Desktop Plan 80
25-1707	Model 3 Desktop Plan 80
25-1708	Model 3 Desktop Plan 80
25-1709	Model 3 Desktop Plan 80
25-1710	Model 3 Desktop Plan 80
25-1711	Model 3 Desktop Plan 80
25-1712	Model 3 Desktop Plan 80
25-1713	Model 3 Desktop Plan 80
25-1714	Model 3 Desktop Plan 80
25-1715	Model 3 Desktop Plan 80
25-1716	Model 3 Desktop Plan 80
25-1717	Model 3 Desktop Plan 80
25-1718	Model 3 Desktop Plan 80
25-1719	Model 3 Desktop Plan 80
25-1720	Model 3 Desktop Plan 80
25-1721	Model 3 Desktop Plan 80
25-1722	Model 3 Desktop Plan 80
25-1723	Model 3 Desktop Plan 80
25-1724	Model 3 Desktop Plan 80
25-1725	Model 3 Desktop Plan 80
25-1726	Model 3 Desktop Plan 80
25-1727	Model 3 Desktop Plan 80
25-1728	Model 3 Desktop Plan 80
25-1729	Model 3 Desktop Plan 80
25-1730	Model 3 Desktop Plan 80
25-1731	Model 3 Desktop Plan 80
25-1732	Model 3 Desktop Plan 80
25-1733	Model 3 Desktop Plan 80
25-1734	Model 3 Desktop Plan 80
25-1735	Model 3 Desktop Plan 80
25-1736	Model 3 Desktop Plan 80
25-1737	Model 3 Desktop Plan 80
25-1738	Model 3 Desktop Plan 80
25-1739	Model 3 Desktop Plan 80
25-1740	Model 3 Desktop Plan 80
25-1741	Model 3 Desktop Plan 80
25-1742	Model 3 Desktop Plan 80
25-1743	Model 3 Desktop Plan 80
25-1744	Model 3 Desktop Plan 80
25-1745	Model 3 Desktop Plan 80
25-1746	Model 3 Desktop Plan 80
25-1747	Model 3 Desktop Plan 80
25-1748	Model 3 Desktop Plan 80
25-1749	Model 3 Desktop Plan 80
25-1750	Model 3 Desktop Plan 80
25-1751	Model 3 Desktop Plan 80
25-1752	Model 3 Desktop Plan 80
25-1753	Model 3 Desktop Plan 80
25-1754	Model 3 Desktop Plan 80
25-1755	Model 3 Desktop Plan 80
25-1756	Model 3 Desktop Plan 80
25-1757	Model 3 Desktop Plan 80
25-1758	Model 3 Desktop Plan 80
25-1759	Model 3 Desktop Plan 80
25-1760	Model 3 Desktop Plan 80
25-1761	Model 3 Desktop Plan 80
25-1762	Model 3 Desktop Plan 80
25-1763	Model 3 Desktop Plan 80
25-1764	Model 3 Desktop Plan 80
25-1765	Model 3 Desktop Plan 80
25-1766	Model 3 Desktop Plan 80
25-1767	Model 3 Desktop Plan 80
25-1768	Model 3 Desktop Plan 80
25-1769	Model 3 Desktop Plan 80
25-1770	Model 3 Desktop Plan 80
25-1771	Model 3 Desktop Plan 80
25-1772	Model 3 Desktop Plan 80
25-1773	Model 3 Desktop Plan 80
25-1774	Model 3 Desktop Plan 80
25-1775	Model 3 Desktop Plan 80
25-1776	Model 3 Desktop Plan 80
25-1777	Model 3 Desktop Plan 80
25-1778	Model 3 Desktop Plan 80
25-1779	Model 3 Desktop Plan 80
25-1780	Model 3 Desktop Plan 80
25-1781	Model 3 Desktop Plan 80
25-1782	Model 3 Desktop Plan 80
25-1783	Model 3 Desktop Plan 80
25-1784	Model 3 Desktop Plan 80
25-1785	Model 3 Desktop Plan 80
25-1786	Model 3 Desktop Plan 80
25-1787	Model 3 Desktop Plan 80
25-1788	Model 3 Desktop Plan 80
25-1789	Model 3 Desktop Plan 80
25-1790	Model 3 Desktop Plan 80
25-1791	Model 3 Desktop Plan 80
25-1792	Model 3 Desktop Plan 80
25-1793	Model 3 Desktop Plan 80
25-1794	Model 3 Desktop Plan 80
25-1795	Model 3 Desktop Plan 80
25-1796	Model 3 Desktop Plan 80
25-1797	Model 3 Desktop Plan 80
25-1798	Model 3 Desktop Plan 80
25-1799	Model 3 Desktop Plan 80
25-1800	Model 3 Desktop Plan 80
25-1801	Model 3 Desktop Plan 80
25-1802	Model 3 Desktop Plan 80
25-1803	Model 3 Desktop Plan 80
25-1804	Model 3 Desktop Plan 80
25-1805	Model 3 Desktop Plan 80
25-1806	Model 3 Desktop Plan 80
25-1807	Model 3 Desktop Plan 80
25-1808	Model 3 Desktop Plan 80
25-1809	Model 3 Desktop Plan 80
25-1810	Model 3 Desktop Plan 80
25-1811	Model 3 Desktop Plan 80
25-1812	Model 3 Desktop Plan 80
25-1813	Model 3 Desktop Plan 80
25-1814	Model 3 Desktop Plan 80
25-1815	Model 3 Desktop Plan 80
25-1816	Model 3 Desktop Plan 80
25-1817	Model 3 Desktop Plan 80
25-1818	Model 3 Desktop Plan 80
25-1819	Model 3 Desktop Plan 80
25-1820	Model 3 Desktop Plan 80
25-1821	Model 3 Desktop Plan 80
25-1822	Model 3 Desktop Plan 80
25-1823	Model 3 Desktop Plan 80
25-1824	Model 3 Desktop Plan 80
25-1825	Model 3 Desktop Plan 80
25-1826	Model 3 Desktop Plan 80
25-1827	Model 3 Desktop Plan 80
25-1828	Model 3 Desktop Plan 80
25-1829	Model 3 Desktop Plan 80
25-1830	Model 3 Desktop Plan 80
25-1831	Model 3 Desktop Plan 80
25-1832	Model 3 Desktop Plan 80
25-1833	Model 3 Desktop Plan 80
25-1834	Model 3 Desktop Plan 80
25-1835	Model 3 Desktop Plan 80
25-1836	Model 3 Desktop Plan 80
25-1837	Model 3 Desktop Plan 80
25-1838	Model 3 Desktop Plan 80
25-1839	Model 3 Desktop Plan 80
25-1840	Model 3 Desktop Plan 80
25-1841	Model 3 Desktop Plan 80
25-1842	Model 3 Desktop Plan 80
25-1843	Model 3 Desktop Plan 80
25-1844	Model 3 Desktop Plan 80
25-1845	Model 3 Desktop Plan 80
25-1846	Model 3 Desktop Plan 80
25-1847	Model 3 Desktop Plan 80
25-1848	Model 3 Desktop Plan 80
25-1849	Model 3 Desktop Plan 80
25-1850	Model 3 Desktop Plan 80
25-1851	Model 3 Desktop Plan 80
25-1852	Model 3 Desktop Plan 80
25-1853	Model 3 Desktop Plan 80
25-1854	Model 3 Desktop Plan 80
25-1855	Model 3 Desktop Plan 80
25-1856	Model 3 Desktop Plan 80
25-1857	Model 3 Desktop Plan 80
25-1858	Model 3 Desktop Plan 80
25-1859	Model 3 Desktop Plan 80
25-1860	Model 3 Desktop Plan 80
25-1861	Model 3 Desktop Plan 80
25-1862	Model 3 Desktop Plan 80
25-1863	Model 3 Desktop Plan 80
25-1864	Model 3 Desktop Plan 80
25-1865	Model 3 Desktop Plan 80
25-1866	Model 3 Desktop Plan 80
25-1867	Model 3 Desktop Plan 80
25-1868	Model 3 Desktop Plan 80
25-1869	Model 3 Desktop Plan 80
25-1870	Model 3 Desktop Plan 80
25-1871	Model 3 Desktop Plan 80
25-1872	Model 3 Desktop Plan 80
25-1873	Model 3 Desktop Plan 80
25-1874	Model 3 Desktop Plan 80
25-1875	Model 3 Desktop Plan 80
25-1876	Model 3 Desktop Plan 80
25-1877	Model 3 Desktop Plan 80
25-1878	Model 3 Desktop Plan 80
25-1879	Model 3 Desktop Plan 80
25-1880	Model 3 Desktop Plan 80
25-1881	Model 3 Desktop Plan 80
25-1882	Model 3 Desktop Plan 80
25-1883	Model 3 Desktop Plan 80
25-1884	Model 3 Desktop Plan 80
25-1885	Model 3 Desktop Plan 80
25-1886	Model 3 Desktop Plan 80
25-1887	Model 3 Desktop Plan 80
25-1888	Model 3 Desktop Plan 80
25-1889	Model 3 Desktop Plan 80
25-1890	Model 3 Desktop Plan 80
25-1891	Model 3 Desktop Plan 80
25-1892	Model 3 Desktop Plan 80
25-1893	Model 3 Desktop Plan 80
25-1894	Model 3 Desktop Plan 80
25-1895	Model 3 Desktop Plan 80
25-1896	Model 3 Desktop Plan 80
25-1897	Model 3 Desktop Plan 80
25-1898	Model 3 Desktop Plan 80
25-1899	Model 3 Desktop Plan 80
25-1900	Model 3 Desktop Plan 80
25-1901	Model 3 Desktop Plan 80
25-1902	Model 3 Desktop Plan 80
25-1903	Model 3 Desktop Plan 80
25-1904	Model 3 Desktop Plan 80
25-1905	Model 3 Desktop Plan 80
25-1906	Model 3 Desktop Plan 80
25-1907	Model 3 Desktop Plan 80
25-1908	Model 3 Desktop Plan 80
25-1909	Model 3 Desktop Plan 80
25-1910	Model 3 Desktop Plan 80
25-1911	Model 3 Desktop Plan 80
25-1912	Model 3 Desktop Plan 80
25-1913	Model 3 Desktop Plan 80
25-1914	Model 3 Desktop Plan 80
25-1915	Model 3 Desktop Plan 80
25-1916	Model 3 Desktop Plan 80
25-1917	Model 3 Desktop Plan 80
25-1918	Model 3 Desktop Plan 80
25-1919	Model 3 Desktop Plan 80
25-1920	Model 3 Desktop Plan 80
25-1921	Model 3 Desktop Plan 80
25-1922	Model 3 Desktop Plan 80
25-1923	Model 3 Desktop Plan 80
25-1924	Model 3 Desktop Plan 80
25-1925	Model 3 Desktop Plan 80
25-1926	Model 3 Desktop Plan 80
25-1927	Model 3 Desktop Plan 80
25-1928	Model 3 Desktop Plan 80
25-1929	Model 3 Desktop Plan 80
25-1930	Model 3 Desktop Plan 80
25-1931	Model 3 Desktop Plan 80
25-1932	Model 3 Desktop Plan 80
25-1933	Model 3 Desktop Plan 80
25-1934	Model 3 Desktop Plan 80
25-1935	Model 3 Desktop Plan 80
25-1936	Model 3 Desktop Plan 80
25-1937	Model 3 Desktop Plan 80
25-1938	Model 3 Desktop Plan 80
25-1939	Model 3 Desktop Plan 80
25-1940	Model 3 Desktop Plan 80
25-1941	Model 3 Desktop Plan 80
25-1942	Model 3 Desktop Plan 80
25-1943	Model 3 Desktop Plan 80
25-1944	Model 3 Desktop Plan 80
25-1945	Model 3 Desktop Plan 80
25-1946	Model 3 Desktop Plan 80
25-1947	Model 3 Desktop Plan 80
25-1948	Model 3 Desktop Plan 80
25-1949	Model 3 Desktop Plan 80
25-1950	Model 3 Desktop Plan 80
25-1951	Model 3 Desktop Plan 80
25-1952	Model 3 Desktop Plan 80
25-1953	Model 3 Desktop Plan 80
25-1954	Model 3 Desktop Plan 80
25-1955	Model 3 Desktop Plan 80
25-1956	Model 3 Desktop Plan 80
25-1957	Model 3 Desktop Plan 80
25-1958	Model 3 Desktop Plan 80
25-1959	Model 3 Desktop Plan 80
25-1960	Model 3 Desktop Plan 80
25-1961	Model 3 Desktop Plan 80
25-1962	Model 3 Desktop Plan 80
25-1963	Model 3 Desktop Plan 80
25-1964	Model 3 Desktop Plan 80
25-1965	Model 3 Desktop Plan 80
25-1966	Model 3 Desktop Plan 80
25-1967	Model 3 Desktop Plan 80
25-1968	Model 3 Desktop Plan 80
25-1969	Model 3 Desktop Plan 80
25-1970	Model 3 Desktop Plan 80
25-1971	Model 3 Desktop Plan 80
25-1972	Model 3 Desktop Plan 80
25-1973	Model 3 Desktop Plan 80
25-1974	Model 3 Desktop Plan 80
25-1975	Model 3 Desktop Plan 80
25-1976	Model 3 Desktop Plan 80
25-1977	Model 3 Desktop Plan 80
25-1978	Model 3 Desktop Plan 80
25-1979	Model 3 Desktop Plan 80
25-1980	Model 3 Desktop Plan 80
25-1981	Model 3 Desktop Plan 80
25-1982	Model 3 Desktop Plan 80
25-1983	Model 3 Desktop Plan 80
25-1984	Model 3 Desktop Plan 80
25-1985	Model 3 Desktop Plan 80
25-1986	Model 3 Desktop Plan 80
25-1987	Model 3 Desktop Plan 80
25-1988	Model 3 Desktop Plan 80
25-1989	Model 3 Desktop Plan 80
25-1990	Model 3 Desktop Plan 80
25-1991	Model 3 Desktop Plan 80
25-1992	Model 3 Desktop Plan 80
25-1993	Model 3 Desktop Plan 80
25-1994	Model 3 Desktop Plan 80
25-1995	Model 3 Desktop Plan 80
25-1996	Model 3 Desktop Plan 80
25-1997	Model 3 Desktop Plan 80
25-1998	Model 3 Desktop Plan 80
25-1999	Model 3 Desktop Plan 80
25-2000	Model 3 Desktop Plan 80

All In Order: Using Sequential-Access Files

Basic can store data on a disk and let you retrieve it at any time. The beauty of this is that a small Basic program can work on large amounts of data: You can manipulate millions of bytes on hundreds of disks without straining your system's memory.

Basic handles two kinds of data files, sequential-access and direct-access. The former is like a string of beads in a goldfish bowl; you must take out the data in the same order in which you put it in. The latter is like the same beads without the string, poured loosely into the bowl, with the added magic that you can dip into the bowl and tweeze the very bead you want.

As you might think, direct-access files are more complex than sequential-access. But don't shy from learning both methods; each has its advantages.

This month I'll discuss how to create and handle sequential-access files. I'll cover direct-access files next month. At the end of this column I'll also tell you how you can receive a free program called WhereWolf, which you can use for scheduling and to study sequential-access programming methods.

Getting Started

Boot up a system disk, and format a fresh disk to hold data files. For formatting instructions, see pages 1-78 of the *Model 4/4P Disk System Owner's Manual*. Now enter Basic.

You can manipulate a file four ways: open it, put things into it, take things out, and close it. Let's start by opening a file.

Type in OPEN "O",1,"CLOWN" and press the enter key. The "O" is the letter O, standing for output. The 1 stands for buffer 1. I'll cover the meaning of buffer numbers later. "Clown" is the name of the data file you're creating.



Program Listing 1. Day/BAS.

```
100 REM * Day File *
110 CLS: CLEAR: N$="OCT"
120 FOR X=1 TO 3
130 X$=MID$(STR$(X),2)
140 G$=M$+X$
150 PRINT "Opening day file "G$
160 OPEN "O",1,G$
170 CLOSE 1
180 NEXT X
190 END
```

End

Program Listing 2. Roster/BAS.

```
100 REM * Roster *
110 CLEAR
120 CLS
130 PRINT "MENU": PRINT "----"
140 PRINT " 1 - Open files A-Z for extending."
150 PRINT " 2 - Output new names to files."
160 PRINT " 3 - Input names for printing."
170 PRINT " 4 - End program run."
180 PRINT: PRINT "Choice: 1, 2, 3 or 4"
190 X$=INKEY$
200 IF X$="" OR INSTR("1234",X$)=0 THEN 190
210 X=VAL(X$)
220 ON X GOTO 240,360,500,620
230 REM *Creating files A-Z
240 CLS: FOR X=65 TO 90
250 PRINT "Opening letter file "CHR$(X)
260 OPEN "E",1,CHR$(X)
270 CLOSE 1: NEXT X
280 PRINT "Files A-Z now open."
290 GOTO 590
300 PRINT "Opening letter file "CHR$(X)
310 OPEN "E",1,CHR$(X)
320 CLOSE 1
330 NEXT X
340 GOTO 590
350 REM * Output new name
360 CLS
370 INPUT "Last name",L$
```

Listing 2 continued

System Requirements

Models 1, III, and 4
32K RAM
Disk Basic

PERIPHERALS

MODEMS

ANCHOR MARK XII	
300/1200 baud (Hayes compatible)	\$259.
ANCHOR MARK X	
300 baud (Hayes compatible)	\$125.
Volkmodem 12 & cable	
300/1200 baud auto/ans au/dl	\$210.
Hayes 300 baud	\$205.
Hayes 1200 baud	\$430.
Volks modems & cable	\$69.
MISCELLANEOUS	
Teknika hi-res. color monitor	\$310.
Comrex green or amber monitor	\$115.
Zenith green or amber monitor	\$115.
Model III/4RS 232 board	\$75.
Model I double density board	\$85.
64K 150ns memory chips	\$1.50
Power strip w/surge protection	\$25.
Bulk diskettes pack of 10	\$10.
Verbatim diskettes pack of 10	\$20.

PRINTERS

EPSON

STAR

1906

LX80	SG10	\$259	6100 Daisywheel	\$425
FX80 +	SG15	\$379	(parallel)	
FX100 +	SD10	\$375	6100 Daisywheel	\$475
RX100	SD15	\$475	(serial)	
LQ1500 & interface	SR10	\$560	6300 Daisywheel	\$725
JX80	SR15	\$640	6000 Daisywheel	\$220
We stock all Radio Shack printers				
Call for price				
Radio Shack, IBM, TI, & Sanyo printer cables				
Printer paper 20 # 2700 sheets				
Epson 80 series ribbon				
\$8.00 Epson 100 series ribbon				
\$10.00				
\$29.00				
\$24.99				

DISK DRIVES

TEAC HALF HEIGHT DISK DRIVES

FDS56 40/40 tk w/case & power	\$125.	FDS56 40/40 tk w/case & power	\$165.
FDS56 40/40 tk dssd bare	\$125.	FDS56 80/80 tk w/case & power supply	\$189.
FDS56 80/80 tk dssd bare	\$150.	Fullsize case & power supply	\$45.
Tandon 40 tk bare	\$125.	Shimline case & power supply	\$45.
Tandon 40/40 tk bare	\$160.	Dual shimline case & power supply	\$55.
8" dual shimline case & power	\$140.		

COMPUTERS

TANDY 1000 W/2 drives	\$995.	IBM W/2 double sided drives, 256K	\$1,849.
TANDY 1000 W/2 drives and RGB color monitor	\$1,295.	IBM W/1 double sided disk drive, one 10 meg hard disk, 256K	\$2,695.
MODEL 4 W/2 drives (26 1069)	\$985.	Monochrome monitor or color monitor display card for IBM or Tandy 1200	\$175.
MODEL 2000 W/2 drives	\$1,349.	High resolution RGB Teknika color monitor	\$310.
TANDY 1200	\$1,599.		

Prices & Specifications subject to change without notice

Listing 2 continued

```

380 INPUT "First name";F$
390 CLS
400 PRINT "<Y>es or <N>o, is this correct: "F$;CHR$(32);L$
410 Z$=INKEY$: IF Z$="" OR INSTR("YyNn",Z$)=0 THEN 410
420 IF Z$="N" OR Z$="n" THEN CLS: PRINT "Let's try it again": PRINT: GOTO 370
430 F1$=L$+"/"+F$
440 PRINT "Being filed as "F1$
450 OPEN "E",1,LEFT$(F1$,1)
460 WRITE #1,F1$
470 CLOSE 1
480 GOTO 590
490 REM * Input names from files
500 CLS: FOR X=65 TO 90
510 PRINT "Names in File "CHR$(X): PRINT STRING$(14,"-")
520 OPEN "I",1,CHR$(X)
525 PRINT LOC(1)
530 IF EOF(1) THEN CLOSE 1: GOTO 570
540 INPUT #1,N$
550 PRINT N$
560 GOTO 530
570 NEXT X
580 REM * BACK TO MENU ROUTINE
590 PRINT: PRINT "Tap key to return to menu."
600 V$=INKEY$
610 IF V$="" THEN 600 ELSE 120
620 PRINT "Run ended.": END

```

End

Now type in CLOSE 1 to close the file. This doesn't destroy it, but just turns it off.

To see if you've actually opened the file, go back to TRSDOS and call the directory (or you can type in SYSTEM "DIR" from Basic). Although it contains no data yet, you should see the file Clown.

You've opened a file in one of three

possible ways. The other two are:

OPEN "E",1,"CLOWN". This opens an existing file named Clown so you can add material. The "E" stands for extend and ensures that the file retains the data already there. This differs from "O," which replaces any existing file named Clown and erases the material it holds.

OPEN "I",1,"CLOWN". This opens an

existing file so you can remove data from it. The "I" stands for input.

Rolling Up Your Sleeves

Now, put these concepts to work. Program Listing 1, Day, creates three files for output: OCT1, OCT2, and OCT3. You could do an entire month by changing line 120 to read FOR X=1 TO 31, but I've kept it simple.

This program introduces a new idea, that you can open a file using a variable. In this case, the key line is 160, OPEN "O",1,G\$, with G\$ containing the file name. G\$ equals M\$, which is always OCT, plus X\$, which is the date. Since I used the same buffer number (1) throughout, you must close the file by buffer number, as in line 170, before you can open a new one.

Now that you've opened a file, you can put material in and take it out. Program Listing 2, Roster, offers a menu of four choices.

Choose option 1 when you first run the program. It automatically creates 26 files, one for each letter of the alphabet. Lines 240-330 do this by making a loop from 65 to 90, the ASCII values of all uppercase letters, and then creating each file as CHR\$(ASCII number).

Circle 71 on Reader Service card.

T80-FS1 Flight Simulator



See your dealer!

Available for Model I or Model III. \$25.00 on cassette or \$33.50 on disk (with enhancements) All versions require 16K.

If you order direct, please specify whether you have Model I or Model III (the media are different) and whether you want disk or cassette. Include \$1.50 and indicate UPS or first class mail. Illinois residents add 3% sales tax. Visa and Mastercard accepted.

If you don't yet own a disk, don't fret. You can upgrade anytime. Cassette users may send back their cassette (not the manual) along with \$10 (first class shipping included) and receive the disk version.

subLOGIC

Communications Corp.
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8462
Telex: 206995

Choice 2, in lines 360-470, lets you enter and send a new name to the letter file matching the first letter of the last name.

Option 3, lines 500-570, opens each file and prints all names in it.

Roster uses sequential-access functions I haven't discussed, so let me briefly tell you about them. PRINT # sends data to a file. The form is PRINT #1,N\$, with the 1 standing for the buffer number and N\$ the string variable holding the material you want sent. It's similar to WRITE # (see below), and when used as PRINT # USING will format data items in the same ways PRINT USING does on the screen.

WRITE # also sends data to a file; this is the form Roster uses. It delimits string values by putting them within quotes and includes commas between items sent to disk.

INPUT # reads a value from the disk. See line 540 of Roster for an example. The program can read a literal, but a variable value is more handy so the program can return to this point as often as needed, sending new values of the same variable to the disk file.

Line Input is an alternative to Input and lets you type up to 254 characters

into a variable value that you can then send to disk using WRITE #. It differs from Input because it accepts commas and quotes as part of the string, accepts Input for the value of but one variable value, and includes leading blanks.

EOF stands for end of file. Programs use an EOF marker to recognize the end of a sequential file. You'll find it in line 530, which translates, "If the end of file 1 has been reached, then close the file and go to line 570 for the next file." Unless a program has an EOF statement, you'll get an error when the program inputs values and tries to find material past the end of the sequential file.

LOC is a sector counter. The command PRINT LOC(1), with 1 standing for the buffer number, will print the number of sectors—256-byte blocks—that you have written to or read from a file since you opened it. Line 525 of Roster returns a zero.

You can think of the buffer numbers 1 to 15 as code numbers for files. In Roster, I've used buffer 1 for all examples, and that's why I was always careful to close the file (CLOSE 1) before opening another under the same buffer number. In more complex programs, you can open several files at once under different

buffer numbers, and send data flying back and forth among all these files. For example, you can open an address file as 1, load its contents into the system as string array entries, sort by zip code and send to a zip file as 2.

Is this all there is to sequential-access? No, but it will get you into the experimental stage. And what I've covered this month is prelude to next month's look at direct-access disk files.

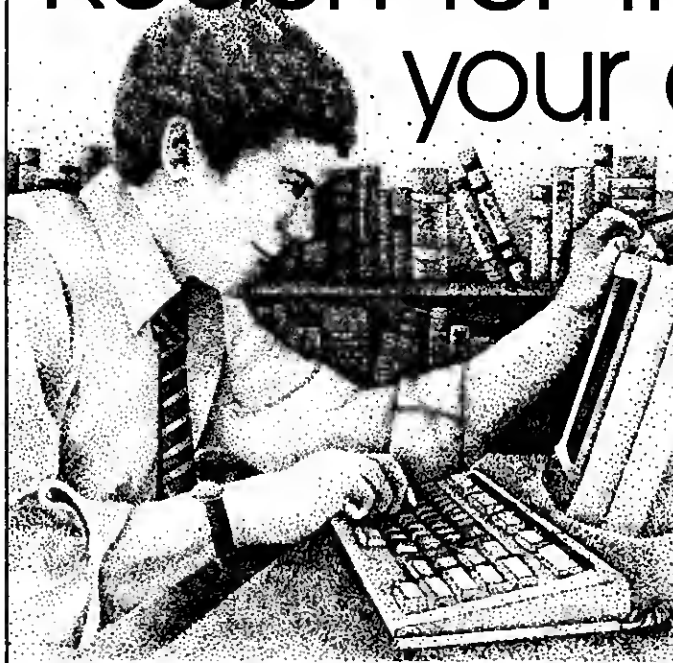
WhereWolf

Now for some free software. WhereWolf is a Model 4/4P meeting scheduler suitable for creating calendars for events and the like. It sorts by time, adds and deletes items, line prints, recognizes scheduling conflicts, and has a few other features that may help you learn sequential-access techniques. To get it, send a formatted Model 4/4P disk, along with a self-addressed mailer or envelope bearing \$1.10 in stamps. Canadians, coins are OK. I'll save the program on your disk and return it along with documentation. ■

Address correspondence to Richard Ramella, 1493 Mt. View Ave., Chico, CA 95926.

Circle 292 on Reader Service card.

Reach for the height of your craft...



As an idea craftsman, you use your mind like a skilled pair of hands. You take hold of concepts, then manipulate them to discover, refine, convey dynamic new thoughts.

Now, the tool that can strengthen your creative grasp is well within your reach.

KAMAS™, a revolutionary outline processor from KAMASOFT*, supports your thinking process and keeps you in touch with your ideas. That's because KAMAS is designed to work the way your mind works—naturally.

Begin by brainstorming. KAMAS enables you to jot down ideas quickly, as you think of them. If you want to elaborate, you can add text with full screen editing.

Then develop your ideas using a familiar outline format. Change the structure as easily as you change your mind. Move on idea and all attached text moves with it.

KAMAS puts full control at your fingertips. You can keep track of your main line of thought by collapsing the details from view.

Then, expand the outline to develop the specifics when you need to. By collapsing and expanding portions of the outline, you can maintain an overview and literally see how your ideas fit together.

And KAMAS is fast. Your ideas remain at your fingertips. KAMAS can locate and retrieve by keyword—even a misspelled one—in less than a second per topic file.

Use as much of the power as you feel comfortable with. KAMAS is menu-driven with over 100 on-line help screens. But you can also open the hood to find a high performance programming environment with the additional horsepower you may need to get the job done. An active user community and the KAMAS Report newsletter keep you in touch with the latest KAMAS applications.

Achieve a commanding vantage point...

KAMAS, Z80, & CP/M are trademarks of KAMASOFT*, Zilog, & Digital Research respectively. * formerly Compusoft Systems.

Get your hands on KAMAS now. Send \$147 plus \$4 for S/H. Or call (503) 649-3765 for VISA or MasterCard orders. KAMAS is available for many Z80, CP/M computers. Ask about your system.

KAMASOFT*
2525 SW 224th Ave., Dept. 151
Aloha, OR 97006

...with **KAMAS**

Getting a Line On Your TRS-80

Drawing a straight line on paper is as simple as connecting two points. But drawing one on a computer screen can be marvelously complicated. While you can easily draw smooth horizontal and vertical lines, the block-like picture elements (pixels) of your display often make other lines look like stair steps.

This month's program lets you draw uniform graph lines with a Model I, III, or 4 (in Model III mode). The first time I ran this program, I was astounded at the quality of graphics I could get, and I spent a couple of hours playing with it. Unless you've been spoiled by a specialized graphics package, you'll probably feel the same way.

The Theory

Program Listing 1, the line-drawing subroutine, uses an algorithm that first determines the ideal line between two points and then translates that ideal into pixels. As the program picks each pixel, it calculates the pixel's distance from the ideal; when that difference becomes too great, the program picks a neighboring pixel to straighten out the line and keep it running in the right direction. The result is a line that's as smooth and thin as possible.

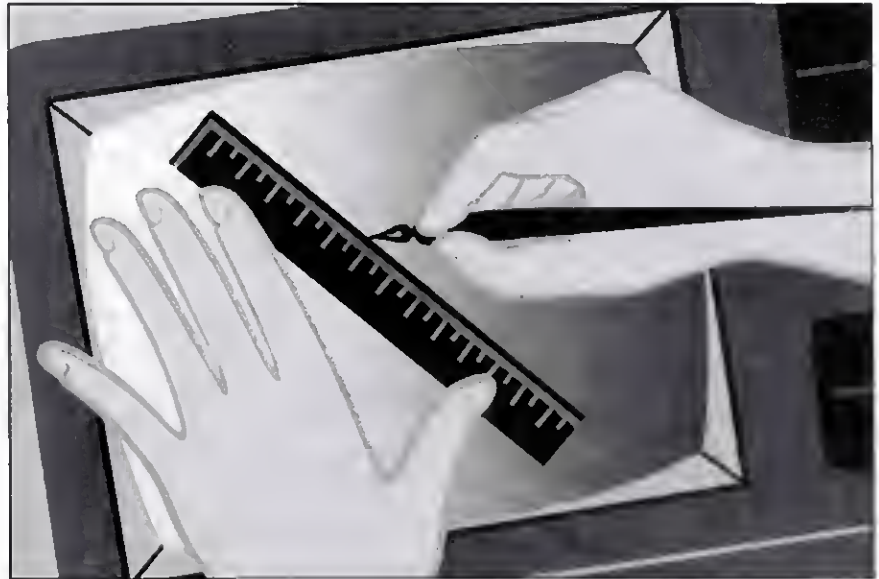
The Model III screen comprises a grid of 128 horizontal by 48 vertical pixels. In Basic, you can address any of these pixels with the Set, Reset, and Point commands by its horizontal (x) and vertical (y) coordinates, where x is a value between zero and 127 and y a value between zero and 47. This month's program uses the same addressing conventions.

Suppose you want to draw a line from the screen's upper left-hand corner (point 0,0) to the lower right-hand corner (point 127,47). The pixels must have



System Requirements

Models III and 4
Disk Basic
Assembly language
Editor/assembler



Program Listing 1. The line-drawing subroutine.

```

00001 ;*****
00002 ; Model I/III Line Generator
00003 ;
00004 ; Calling sequence: DIM Array%(7): I% = varptr(Array%(0))
00005 ; Z = USR(I%)
00006 ; Array%(0) = x1, Array%(1) = x2
00007 ; Array%(2) = x2, Array%(3)=y2
00008 ; Array%(4) = 0 or -1 (0 = set line)
00009 ; (-1 = reset line)
00010 ; x1,y1 is the starting point of the line
00011 ; x2,y2 is the ending point of the line
00012 ; (0 <= x1,x2 <= 127)
00013 ; (0 <= y1,y2 <= 47)
00014 ;*****
00015 ERROR EQU 1E4AH ;Illegal function call
00016 ;
00017 ORG 0F000H ;Will relocate
00018 CALL 0A7FH ;Get argument in HL
00019 PUSH HL ;Transfer array address
00020 POP IX ; to IX
00021 ;
00022 ; Check range of arguments
00023 ;-----
00024 LD A,(IX+1) ;Get MSB of x1
00025 OR (IX+3) ;Merge MSB of y1
00026 OR (IX+5) ;Merge MSB of x2
00027 OR (IX+7) ;Merge MSB of y2
00028 JP NZ,ERROR ;Error if not all 0
00029 ;
00030 LO A,(IX+0) ;Get LSB of x1
00031 OR (IX+4) ;Merge LSB of x2
00032 CP 00H ;Both less than 128?
00033 JP NC,ERROR ;Error if not
00034 ;
00035 LD A,(IX+2) ;Get LSB of y1
00036 CP 30H ;Less than 48?
00037 JP NC,ERROR ;Error if not
00038 LD A,(IX+6) ;Get LSB of y2
00039 CP 30H ;Less than 48?
00040 JP NC,ERROR ;Error if not
00041 ;-----
00042 ; Pick up x1,y1 and x2,y2 and determine slope
00043 ;-----
00044 LD D,(IX+0) ;Get x1
00045 LD E,(IX+2) ;Get y1//DE=starting point
00046 LD H,(IX+4) ;Get x2
00047 LD L,(IX+6) ;Get y2 HL=end point
00048 PUSH DE ;Save start

```

Listing 1 continued

Listing 1 continued

```

00049 ;
00050 LD A,H ;A = x2
00051 LD H,1 ;l = positive step
00052 SUB D ;A = x2 - x1
00053 JR NC,LINE10 ;Go if x2 > x1
00054 NEG ;A = x1 - x2
00055 LD H,-1 ;-l = negative step
00056 LD B,A ;B = x distance
00057 ;
00058 LD A,L ;Now get y2
00059 LD L,1 ;l = positive y step
00060 SUB E ;A = y2 - y1
00061 JR NC,LINE20 ;Go if y2 > y1
00062 NEG ;A = y1 - y2
00063 LD L,-1 ;-l = negative step
00064 LD C,A ;C = y distance
00065 ;
00066 LD DE,0 ;D = alternate x step
00067 ;E = regular y step
00068 CP B ;Is dx > dy?
00069 JR C,LINE30 ;Go if dx > dy
00070 LD C,B ;Else dx in c
00071 LD B,A ;and dy in B B >= C
00072 EX DE,HL ;exchange steps
00073 ;-----
00074 ;Now B = larger distance
00075 ;C = shorter distance
00076 ;H = regular x step
00077 ;D = alternate x step
00078 ;E = regular y step
00079 ;L = alternate y step
00080 ; all steps are 1, B, or -1
00081 ;
00082 ; Save all values
00083 ;-----
00084 LINE30 LD (IX+10),H ;Save regular x step
00085 LD (IX+11),D ; alternate x step
00086 LD (IX+12),E ; normal y step
00087 LD (IX+13),L ; alternate y step
00088 LD L,B ;L has long distance
00089 LD H,C ;H has short distance
00090 LD C,B ;C also has long dist.
00091 SRL C ;C = long dist / 2
00092 INC B ;B = # of points on long axis
00093 POP DE ;DE has starting point
00094 LINE40 PUSH HL ;Save distances
00095 PUSH BC ;And counters
00096 ;-----
00097 ; Calculate screen location of y coordinate
00098 ;-----
00099 LD L,-1 ;Initialize for quotient
00100 LD A,E ;Get y coordinate
00101 ;divide y by 3
00102 LINE50 INC L ;Start with L = 0
00103 SUB 3 ;A = A - 3
00104 JR NC,LINE50 ;Loop until A < 0
00105 ADD A,3 ;A = 0,1, or 2
00106 LD C,A ;C has remainder
00107 LD H,0 ;HL = screen line
00108 ;-----
00109 ; Multiply HL * 64
00110 ;-----
00111 LD B,6 ;Counter
00112 OR A ;Clear carry flag
00113 LINE60 RL L ;L = L * 2
00114 RL H ;HL = HL * 2
00115 DJNZ LINE60 ;Do (HL*2) * 6
00116 LD A,3CH ;Screen starts at 3C00H
00117 ADD A,H ;Add MSB of screen line
00118 LD H,A ;HL=> beg. of screen line
00119 ;-----
00120 ; Now find address of x coordinate
00121 ;-----
00122 LD A,D ;Get x coordinate
00123 SRL A ;A = x/2, CF has remainder
00124 RL B ;Remainder to B
00125 ADD A,L ;Add line position to L
00126 LD L,A ;HL=> correct pixel
00127 ;-----
00128 ; Find pixel at HL
00129 ;-----
00130 RL C ;C = C * 2
00131 LD A,C ;Get value from C
00132 ADD A,B ;A has bit number (0-5)
00133 LD B,A ;Pixel number to B
00134 INC B ;B = bit number + 1 (1-6)
00135 XOR A ;A = 0
00136 SCF ;Carry flag has bit
00137 LINE70 RLA ;Rotate carry bit until
00138 DJNZ LINE70 ; bit is correctly positioned
00139 ;-----
00140 ; Make HL a graphics character if it isn't already
00141 ;-----
00142 BIT 7,(HL) ;Is high bit set?
00143 NOP ;Pause for 32-c;Go if dx > dy
00144 LD C,B ;Else dx in c
00145 LD B,A ;and dy in B B >= C
00146 EX DE,HL ;exchange steps
00147 ;-----
00148 ;Now B = larger distance
00149 ;C = shorter distance
00150 ;H = regular x step
00151 ;D = alternate x step
00152 ;E = regular y step
00153 ;L = alternate y step

```

Listing 1 continued

128 x and 48 y values. The algorithm first recognizes that the x value changes more often than the y value. It defines a "normal" step from one pixel to the next as "Add 1 to the last x position; add zero to the last y position." However, the program takes the normal step only five out of every eight times. It uses an alternate step the other three: "Add 1 to the last x position; add 1 to the last y position."

The program determines whether to take a normal or an alternate step by adding up the cumulative error of the actual line from the ideal line after every step. When the error is smaller than half a pixel, the algorithm selects a normal step to find the next position to set. But when the error is larger than half the width of a pixel, the program selects the alternate step and reduces the error sum.

The Program

I designed the source code so you could add it to the Basic program in Program Listing 2. To call the routine, you must dimension an integer array of at least seven elements. Put the starting x value in array element zero, the starting y value in element 1, the ending x value in element 2, and the ending y value in element 3. You should put a zero in element 4 if you want to turn on ("set") all the pixels in the line; put a -1 in element 4 if you want to turn off ("reset") the line. The program needs elements 5 and 6 for a storage buffer. Be sure you include them in the array or the line routine might change other values stored in memory.

Lines 240-490 check the values you've sent to the program and ensure that they're within the screen's limits. If the program finds a value that would take the line off the screen, it jumps to the ROM routine that reports an illegal function call and stops the program.

Next, in lines 530-810, the routine calculates the x and y steps for your line. Either the regular or alternate step for each direction will be a zero; the other will be a 1 or a -1 depending on the direction of the line. The same section determines the error correction ratio, which it stores in the B and C registers.

Starting in line 930, the program saves the step values in the extra two elements of the array, puts the error ratio in the HL register pair, and holds the number of steps needed for the full line in the B register. The program will use the value in the C register to calculate when it should select alternate steps. Finally, it recovers the starting point of the line from the stack and saves the error ratio and counters.

The middle section of the program, lines 1080-1750, finds the memory address of a screen pixel and whether that pixel is on or off. You might have trouble

understanding this section—writing math functions in Assembly language can be complex.

First, the program divides the y coordinate by 3 to find the correct screen row. A subtraction loop that starts on line 1110 does the division. The HL register pair holds the quotient and the C register holds the remainder.

The routine then determines how far the beginning of that screen row is from the start of the screen by multiplying the value in HL by the 64 characters per row. Since 64 is 2 to the sixth power, the program multiplies HL by 2 six times. Finally, the program adds the result of the multiplication to 3C00 hexadecimal (hex), the beginning address of screen memory; by line 1270, HL points to the beginning of the correct row on the screen.

Once the routine finds the row, it has to determine which column in that row holds the correct pixel. The program divides the x coordinate by 2 and adds the result to HL, and HL finally points to the correct byte. However, you still have to find out which pixel to set or reset.

The C register still holds the remainder of the first division and it must be zero, 1, or 2. The program multiplies that value by 2, adds the remainder of the second division (either zero or 1), and ends up with a pixel number in the range of zero to 5. The routine completes calculations by rotating a single bit through the A register until it moves into position to address the necessary screen pixel.

By line 1510, the HL register points to the correct byte in video memory, and the A register has the necessary value to turn on the pixel addressed by the x and y coordinates. The hardest part is finally over.

Two tests, beginning in line 1510, determine whether the screen displays an ASCII character or graphics character at the current location. If the program finds an ASCII character, it erases the character and replaces it with a graphics blank.

Then, in line 1640, the program tests the fifth array element to find out whether it should turn the pixel on or off. In either case, a simple logic operation either sets or resets the correct bit, and the program has finally taken care of one point on the line. The last section of the program, from lines 1790–2070, decides whether the program takes the regular or alternate step and adjusts the DE register accordingly. Then the program loops back to find the next pixel on the line.

Using and Modifying The Line Routine

Program Listing 2 shows how you can load, initialize, and call the line routine from a Model III Basic program. Lines 25 to 90 demonstrate how fast this program

Listing 1 continued

```

00154 ; all steps are 1,0, or -1
00155 ;
00156 ; Save all values
00157 ;-----
00158 LINE30 LD (IX+10),H ;Save regular x step
00159 LD (IX+11),D ; alternate x step
00160 LD (IX+12),E ; normal y step
00161 LD (IX+13),L ; alternate y step
00162 LD L,B ;L has long distance
00163 LD H,C ;H has short distance
00164 LD C,B ;C also has long dist.
00165 SRL C ;C = long dist / 2
00166 INC B ;B = # of points on long axis
00167 POP DE ;DE has starting point
00168 LINE40 PUSH HL ;Save distances
00169 PUSH BC ;And counters
00170 ;-----
00171 ; Calculate screen location of y coordinate
00172 ;-----
00173 LD L,-1 ;Initialize for quotient
00174 LD A,E ;Get y coordinate
00175 ;divide y by 3
00176 LINE50 INC L ;Start with L = B
00177 SUB 3 ;A = A - 3
00178 JR NC,LINE50 ;Loop until A < 0
00179 ADD A,3 ;A = 0,1, or 2
00180 LD C,A ;C has remainder
00181 LD H,0 ;HL = screen line
00182 ;-----
00183 ; Multiply HL * 64
00184 ;-----
00185 LD B,6 ;Counter
00186 OR A ;Clear carry flag
00187 RL L ;L = L * 2
00188 RL H ;HL = HL * 2
00189 DJNZ LINE60 ;Do (HL*2) * 6
00190 LD A,3CH ;Screen starts at 3C00H
00191 ADD A,H ;Add MSB of screen line
00192 LD N,A ;HL=> beg. of screen line
00193 ;-----
00194 ; Now find address of x coordinate
00195 ;-----
00196 LD A,D ;Get x coordinate
00197 SRL A ;A = x/2, CF has remainder
00198 RL B ;Remainder to B
00199 ADD A,L ;Add line position to L
00200 LD L,A ;HL=> correct pixel
00201 ;-----
00202 ; Find pixel at HL
00203 ;-----
00204 RL C ;C = C * 2
00205 LD A,C ;Get value from C
00206 ADD A,B ;A has bit number (0-5)
00207 LD B,A ;Pixel number to B
00208 INC B ;B = bit number + 1 (1-6)
00209 XOR A ;A = 0
00210 SCF ;Carry flag has bit
00211 RLA ;Rotate carry bit until
00212 DJNZ LINE70 ; bit is correctly positioned
00213 ;-----
00214 ; Make HL a graphics character if it isn't already
00215 ;-----
00216 BIT 7,(HL) ;Is high bit set?
00217 NOP ;Pause for 32-char. mode
00218 JR 2,LINE80 ;Go if not set
00219 ;
00220 BIT 6,(HL) ;Is this bit reset?
00221 NOP ;32-char. mode pause
00222 JR 2,LINE90 ;Go if already graphics
00223 ;
00224 LINE80 LD (HL),00H ;Make a graphics blank
00225 NOP ;Another 32-char. pause
00226 ;-----
00227 ; Set or reset correct bit
00228 ;-----
00229 LINE90 BIT 0,(IX+0) ;Get Set/Reset flag
00230 JR NZ,LIN100 ;Go to reset
00231 OR (HL) ;OR pixel with set bit
00232 NOP ;Pause
00233 JR LIN110 ;And skip reset code
00234 ;
00235 LIN100 CPL (HL) ;Complement A for reset
00236 AND (HL) ;Mask out our pixel
00237 NOP ;Pause
00238 ;
00239 LIN110 LD (HL),A ;Set new value on screen
00240 NOP ;One more pause
00241 ;-----
00242 ; One pixel is set -- find x,y address of next
00243 ;-----
00244 POP BC ;Recover counters
00245 POP HL ;Recover distances
00246 LD A,D ;Get current x coordinate
00247 ADD A,(IX+10) ;Add regular x step
00248 LD D,A ;Store new x coordinate
00249 ;
00250 LD A,E ;Get current y coordinate
00251 ADD A,(IX+12) ;Add regular y step
00252 LD E,A ;Store new y coordinate
00253 ;-----
00254 ; Is it time for alternate step?
00255 ;-----
00256 LD A,C ;Get check value
00257 ADD A,H ;Add short distance

```

Listing 1 continued

Listing 1 continued

```

00250 LD C,A ;Save back in C register
00259 CF L ;Compare long distance
00260 JR C,LINE120 ;Don't adjust if L > C
00261 ;
00262 ; Adjust with alternate steps
00263 ;
00264 SUB L ;A = C-L: adjust check value
00265 LD C,A ;Store new check value
00266 LD A,D ;Get new x coordinate
00267 ADD A,(IX+11) ;Adjust by alternate step
00268 LD D,A ;Save as new x coordinate
00269 ;
00270 LD A,E ;Get new y coordinate
00271 ADD A,(IX+13) ;Adjust by alternate step
00272 LD E,A ;Save as new y coordinate
00273 ;
00274 ; Repeat until line is drawn, then return to Basic
00275 ;
00276 LINE120 DJNZ LINE40 ;Loop until B = 0
00277 RET ;Back to Basic
00278 ;
00279 END
EOF

```

End

Program Listing 2. The Basic demonstration program.

```

1 'Model I/III Line-Drawing
  Demonstration Program

10 CLS: DIN A$(7),I$,K$
20 GOSUB 60100: DEFUSR=VARPTR(Q$(0))
21 ' Warning!
   If you use any variables that have not already been
   given a value or DIMensioned, you MUST redefine
   the USR address: DEFUSR = VARPTR(Q$(0))

25 A$(4)=0
30 FOR K$ = 0 TO 47
31 A$(0)=0: A$(1)=0: A$(2)=127-K$*2.7: A$(3)=K$
32 I$=USR(VARPTR(A$(0)))
33 NEXT K$
34 FOR K$=47 TO 0 STEP -1
35 A$(0)=127:A$(1)=47:A$(2)=127-K$*2.7:A$(3)=K$
36 I$=USR(VARPTR(A$(0)))
37 NEXT K$
38 A$(4)=-1
39 FOR K$ = 1 TO 47 STEP 4
40 A$(0)=0: A$(1)=K$: A$(2)=127: A$(3)=K$
41 I$=USR(VARPTR(A$(0)))
42 NEXT K$
43 FOR K$ = 1 TO 127 STEP 4
44 A$(0)=K$: A$(1)=0: A$(2)=K$: A$(3)=47
45 I$=USR(VARPTR(A$(0)))
46 NEXT K$
90 CLS: GOTO 25
100 '

60000 ' Data for line-drawing routine
60001 DATA 32717, -6902, -7715, 32477, -8959, 950
60002 DATA -10723, -8955, 1974, 19130, -8930, 126
60003 DATA -10723, -500, -11640, 7754, 32477, -510
60004 DATA -11720, 7754, 32477, -506, -11720, 7754
60005 DATA 22237, -8960, 606, 26333, -8956, 1646
60006 DATA 31957, 294, 12434, -8060, 9796, 10431
60007 DATA 11901, -27903, 1072, 17645, -210, 4431
60008 DATA 0, 14520, 10435, -5305, 29917, -8950
60009 DATA 2930, 29661, -8940, 3445, 24936, -13496
60010 DATA 1001, -6703, 11973, 31743, -10708, 12291
60011 DATA -14597, 20227, 30, 1542, -13385, -13547
60012 DATA 4116, 16122, -31604, 31335, 16331, 4299
60013 DATA 20549, 4555, -32647, 1095, 14255, 4119
60014 DATA -13315, 126, 1320, 30411, 10240, 13027
60015 DATA 120, -13347, 17920, 1056, 182, 792
60016 DATA -22993, 30464, -16120, 31457, -31011, 22202
60017 DATA -0037, 3206, 31071, 20356, 14525, -27300
60018 DATA 31311, -31011, 22203, -8037, 3462, 4191
60019 DATA -13930
60100 DIN Q$(100): RESTORE
60101 T=0
60110 FOR I$=0 TO 100:
  READ Q$(I$):
  T=T+Q$(I$):
NEXT I$
60115 IF T <> 439331 THEN
  PRINT "Checksum error -- Verify Data":
  STOP
60120 RETURN

```

End

can draw 140 lines on the screen.

You can use essentially the same routine on a Model 4 with a few modifications. The error-checking section will have to allow x values between zero and 159, and y values between zero and 71, for example. You will also have to decide how the routine should address video memory. You have at least three choices:

- You can dedicate a 1,920-byte buffer (perhaps an integer array of 960 elements or a series of file buffers) to hold an image of the screen, use the @VDCTL SVC to copy the screen there, draw the entire line, and then copy the buffer back to the screen. You would have to ensure that the buffer begins at address 0EC00 hex or lower.

- You can determine the row and column, but not the absolute address, of each pixel and then use @VDCTL to get a copy of a single byte. You would then set the correct pixel in that byte and again call @VDCTL to put the new byte back in screen memory.

- If you're adventurous, you can use the information in the hardware section of the Model 4 technical manual to bring video and keyboard memory into the top 3K of addressable memory space and deal with the screen directly. If you take that approach, be sure to turn off all interrupts until you restore the normal memory configuration.

Model 4 graphics present one problem that is impossible to solve without completely rewriting the line-drawing algorithm. Model I/III pixels are all the same size but the Model 4 has two different sizes in each byte. Therefore, any line you draw will look slightly out of proportion.

You might also want to rewrite Listing 1 slightly so that you can call it from another machine-language routine. You would need to put the line's parameters into a buffer that the routine can find, and then call it. You would only have to change the first few lines of Listing 1 to do so.

Depending on your own programming needs, you may or may not find the line routine useful on a day-to-day basis, but you will probably enjoy experimenting with it. And you might want to use the program to educate your friends who may mistakenly think that the TRS-80 is incapable of displaying graphics. ■

You can contact Hardin Brothers through CompuServe. Go PCS-117 to the Writers' and Editors' SIG (WESIG) and leave your message addressed to htm. Feel free to join in discussions started by others.

You can also write to Hardin at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope if you want a reply.

On Your Marks: Your Spreadsheet as Gradebook

by Doug Peterson

As a teacher, I find a good spreadsheet invaluable for calculating and printing out my students' marks. I can update marks whenever I want or monitor a student's progress throughout a term. Because my computer does the averaging, it's as easy to process a test with 27 questions as one with 50.

My VisiCalc template, Report Card, calculates student marks based on tests, assignments, and class performance (see Fig. 1). Once you understand how the entries work, you can customize the template to suit your own grading system.

The Setup

Start by entering the relative weighting for tests in cell C5. Type in weightings for assignments and class marks in cells C6 and C7. Enter students' last names in column A and first names in column B. If you need more room, use the global command /GC# to adjust column width.

Type in each student's grade on test 1 in column C. In cell C18, type in the test total; that is, the number of questions or maximum possible score. Repeat this procedure for each test and assignment, and for class performance.



The Formulas

Report Card calculates the average test 1 score in cell C17 using the formula @AVERAGE(C11...C15). The command /F\$ formats the result to show only two decimal places.

Since the formula is the same for the rest of the tests, assignments, and class marks, replicate this formula for cells D17 through K17, using /F\$ to format

each answer. Figure 2 shows Report Card's formula listing.

Because my VisiCalc version limits formula lengths, the template calculates the test and assignment totals in separate cells. To calculate the test total, enter the formula @SUM(C18...F18) in cell M1. Enter the formula for the assignments total, @SUM(G18...I18), in cell M2. Because they're so far to the right,

	A	B	C	D	E	F	G	H	I	J	K
1	Period 3 1985 #1 #1										
2											
3	Weightings										
4	-----										
5	Tests		60%								
6	Assignments		30%								
7	Class Marks		10%								
8											
9	Name		Test 1	Test 2	Test 3	Test 4	Assign 1	Assign 2	Assign 3	Class	Average
10	-----										
11	Able, Joan		20	8	47	19	39	21	27	7	87.68
12	Brown, Barry		24	7	25	18	37	22	21	8	75.15
13	Carney, Mary		21	8	38	17	40	24	29	6	82.92
14	Dent, Gerry		23	9	39	17.5	48	18	30	7	84.88
15	Edwards, Eddy		18	10	41	11	32	12	20	8	73.49
16											
17	Average		21.20	8.40	38.00	16.50	37.60	19.40	25.40	7.20	80.82
18	Total		25	10	50	21	40	25	30	10	100
19											
20	Highest Mark ----->		87.68								
21	Lowest Mark ----->		73.49								

Figure 1. Report Card template.

Figure 1. Report Card template.

Circle 218 on Reader Service card.

TRS-80+ MOD I, III, COCO, TI99/4a
TIMEX 1000, OSBORNE, others

GOLD PLUG - 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors.

GOLD PLUG 80 solders to the board edge connector. Use your existing cables. (if gold plated)

GOLD PLUG 80 Mod I (6)	\$44.95	\$54.95
Keyboard/EI (mod I)	15.95	18.95
Individual connectors	7.95	9.95
COCO Disk Module (2)	16.95	18.95
Ground tab extensions	INCL	1.00
Disk Drives (all R.S.)	7.95	9.95
Gold Disk Cable 2 Drive		29.95
Four Drive Cable		39.95
GOLD PLUG 80 Mod III (6)		54.95
Internal 2 Drive Cable		29.95
Mod III Expansion port		10.95
USA shipping \$1.45		Can/Mex \$4.
Foreign \$7.		TEXAS 5% TAX

SPECIAL
PRICESCOCO MODULE
INSTALLATION
AVAILABLE

Ask your favorite dealer or order direct



E.A.P. CO.

P.O. BOX 14

KELLER, TEXAS 76248

(817) 498-4242

+ trademark Tandy Corp



MC/VISA

Circle 186 on Reader Service card.

NEW FOR
PROFILE* USERS

PROfix * III™ RESTRUCTURE & TRANSFER UTILITY \$49.95

For PROFILE* III PLUS
Model III/4

ALSO NOW

For PROFILE PLUS
Model II/12

Needs change—Experience teaches—and if you could redefine your data base today, you probably would change a few things—

WELL, NOW YOU CAN!

PROfix*III Provides you, as a user of Profile III Plus, with a powerful, easy-to-use package that allows you to reorganize your data base TO MEET TODAY'S NEEDS, and then moves your existing data into your new file structure.

*** FEATURES ***

- EASY TO USE—no special charts to fill out
- FAST—assembly language speed
- RE-ARRANGE FIELDS—even across segments
- DROP OR ADD FIELDS
- CHANGE FIELD LENGTHS—R/L justify data
- CHANGE NUMBER OF SEGMENTS
- CREATE SORTED FILE—drop deleted fields
- LITERAL INSERTION—specified fields
- COMPLETE USER MANUAL—with examples

TO ORDER — SEND \$49.95/MODEL III/4
SEND \$89.95/MODEL II/12

Plus \$2.50 for Handling and Postage
Check, M.O., VISA/MC
(for charge card, give expiration date, number)
—To—

BLUE RIDGE SOFTWARE

230 Chesterfield Road
Lynchburg, VA 24502

For phone orders or more information
Call (804) 239-0574 \$1.00 off on phone orders!
Virginia residents add 4% sales tax
Most orders filled within 24 hours
(allow 2 weeks for checks to clear)

Profile, TRSDOS, are a registered trademark of Tandy Corp
LDOS is a registered trademark of Logical System Inc

PLEASE SPECIFY VERSION

PowerSCRIPT 4.2

The state-of-the art UNIVERSAL add-on enhancement for SCRIPSIT® users!

Now supports TRUE Model 4/4P

80 column version of SCRIPSIT

Supports ALL released versions of
SCRIPSIT® for 4/III/I.

Get the MOST from your printer!

Our PowerSCRIPT modification for SCRIPSIT (all versions) gives you everything that SuperSCRIPSIT does, except for proportional printing, but we give features that even SS doesn't have! Our files are full of letters from enthusiastic users who cannot believe how powerful little ole SCRIPSIT can become with PowerSCRIPT! (and this version adds even more features!)

With all the smarter printers out there, it doesn't make sense to use a "dumb" word processor anymore. If you notice, there are MANY word processors out there besides the ones available from TANDY. We could recommend every one of them, IF YOU WANTED TO BUY SOMETHING NEW! What if you don't want to pop another \$200 bucks for another program? What if you don't NEED another program, but you'd like a LOT of new features without relearning a WHOLE NEW SYSTEM? SCRIPSIT is a VERY good program - we just give it some horsepower and bring it up to today's standards! PowerSCRIPT gives you MANY new features, while retaining the commands you already know - at a very low price! All your previous files will, of course be compatible.

Some features that get added to SCRIPSIT via PowerSCRIPT 4.2:

- Send commands to printer to activate special formats and functions, even embedded in the middle of the line!
- Get an ALPHABETICAL Directory from within PSCRIPT and FETCH, KILL, or CHAIN, any file right from the display! No more going back to DOS!
- Keyboard can be customized for special needs or keys.
- Special characters can be generated from keyboard without using special printer codes!
- Removes protection for your own use.
- Any code from 1 through 255 can be sent to printer through special format line.
- Video PAGE FORWARD OR REVERSE at a key-stroke!
- Multiple files can be CHAINED together at print time!
- Will not crash programs protected in HIGH MEMORY.
- "END" returns to DOS READY quickly instead of rebooting operating system.
- Built-in HELP command! HELP can be modified by user.
- Optionally select line feed after carriage return.
- Support for user-definable filters included.

For Model 4/4P, III, or I (lower case only). Works with most Model I/III operating systems or TRSDOS 6.0-6.2 on the Mod 4. Will work OK with TRSDOS 2.7DD, except for DIR from PSCRIPT. Purchaser must own appropriate version of disk-based SCRIPSIT

PowerSCRIPT 4.2 Still only \$39.95

SuperSCRIPSIT® Users...

We didn't leave YOU out!

Now you can use SuperSCRIPT on your NON-Tandy printer! Your printer will work great using our special Printer Drivers customized for your particular printer and SuperSCRIPSIT. Low priced too, so don't miss out if you have one of the printer models listed! Model 4 fully supported!

- EPSON MX-80/100 series
- EPSON FX/RX 80/100 series
- Most all EPSON "compatibles"
- Okidata 92/93 Dot Matrix
- C. Itoh 8510 Prowriter
- C. Itoh A10-20 Daisy
- C. Itoh F-10 Stenwriter

All features of SuperSCRIPSIT are supported to the fullest capabilities of the printer. Easy to install at OPEN DOCUMENT screen easy to use, and no extra commands to learn!

PowerDRIVER—Only 29.95 ea.

PLEASE SPECIFY PRINTER TYPE!

POWERSOFT

17060 Dallas Parkway, Suite 114
Dallas, TX 75248

(214) 733-4475



SPREADSHEET BEAT

Cell	Formula
A4, A10--K10	/=
C17	/F\$ @AVERAGE(C11...C15)
D17	/F\$ @AVERAGE(D11...D15)
...	...
K17	/F\$ @AVERAGE(K11...K15)
D5, D6, D7	/FL
C20	@MAX(K11...K15)
C21	@MIN(K11...K15)
M1	@SUM(C18...F18)
M2	@SUM(G18...J18)
K11	/F\$ @SUM(C11...F11)/M1*C5+(@SUM(G11...J11)/M2*C6)+(J11/J18*C7)
K12	/F\$ @SUM(C12...F12)/M1*C5+(@SUM(G12...J12)/M2*C6)+(J12/J18*C7)
...	...
K15	/F\$ @SUM(C15...F15)/M1*C5+(@SUM(G15...J15)/M2*C6)+(J15/J18*C7)

Figure 2. Report Card's formula listing.

$$\frac{(ST*W1)}{TT} + \frac{(SA*W2)}{TA} + \frac{(CM*W3)}{TC}$$

ST = Number of tests	W2 = Weighting for assignments
TT = Maximum possible test score	CM = Student's class mark
W1 = Weighting for tests	TC = Maximum possible class mark
SA = Number of assignments	W3 = Weighting for class mark
TA = Maximum possible assignments score	

Figure 3. The formula for student averages.

cells M1 and M2 don't show up when you print out the template.

Now you can enter each student's average. Figure 3 shows the formula and describes the variables. Format cell K11 with the command /F\$ and enter the formula @SUM (C11...F11)/M1*C5 + (@SUM (G11...J11)/M2*C6)+(J11/J18*C7). The spreadsheet calculates and displays the first student's average. Replicate the formula for each student.

To determine the highest mark, enter the formula @MAX(K11...K15) in cell C20; use the formula @MIN(K11...K15) in cell 21 to find the lowest mark. Again, you should format these cells as /F\$. ■

Doug Peterson teaches data processing at Sandwich Secondary School in Windsor, Ontario. You can contact him at 62 Boardwalk, Amherstburg, Ont., Canada N9V 3H3.

Send your templates or spreadsheet tips to Spreadsheet Beat, 80 Micro, 80 Pine St., Peterborough, NH 03458. We'll pay \$50 for each one we publish.



System Requirements VisiCalc

Circle 470 on Reader Service card.

96K MODEL 100

The PG Design 64K RAM module adds two additional 32K RAM banks to your existing Model 100. The firmware that comes in your Model 100, BASIC, TEXT, TELCOM, ADDRSS, SCHEDL, are all present in each additional RAM bank.

You may transfer files from one RAM bank to any of the other RAM banks by using the function keys.

We designed our RAM module to allow clear access to the ROM slot and we provided a forty pin, male connector to utilize Radio Shack's DVI or other disk drive systems. We have installed a lithium power cell to maintain the memory of the module for six months if you should remove it from your Model 100. But, while in the Model 100, the power cell has a life span over six years!

The RAM module snaps easily into the expansion port in the bottom of your Model 100.

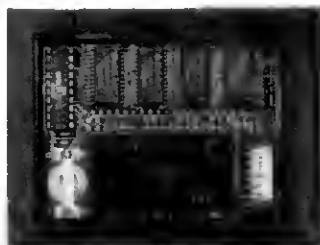
Guarantee

We guarantee that all PG Design products perform to your complete satisfaction, or your money back! We manufacture the highest quality RAM modules available anywhere.

Order Today

64K RAM module	\$375
32K RAM version	\$250
Upgrade later for	\$150

*8K Ram modules for \$34.95 ea.
Model 100--
Set of three-- \$99.99
*24K RAM modules \$139
for Model 200--
Two or more-- \$135 ea.
send check, money order,
Visa, & Mastercard accepted



PG Design Electronics, Inc. 66040 Gratiot, Richmond, MI 48062 (313)727-2744

Circle 490 on Reader Service card.



FREE



Order our catalog that's on disk for \$7.00. There's a program for every computer user. SAVE TIME and let the computer search for the topic for you on our Catalog disk.

PERSONAL:

Federal Income Tax, Wills, Home Budget, Financial, Date Book, Improve Reading

TECHNICAL:

Unprotect Software, Compress Basic, Cheap Assembler, Assembly Tutor, Pascal, Fortran

BUSINESS:

General Ledger, Setup Dot Matrix Printer, Setup Letter Quality Printer, Mail List, Bar Graphs, Print Spooler

GAMES:

Chess, Star Trek, PacMan, Rubik's Cube, Worm Eat em Apple, Frogger, Kaleidoscope, Modify for Flight Simulator

SPECIALITY:

Ham Radio, Real Time Simulation of B747 Flight, Kermit

We have a special package (\$1) with 5 disks that include: communication, spreadsheet models, games, music, sorted directory, etc

Name _____ Disk # _____
Address _____ Special _____
City _____ Calif. Res. Add _____
State _____ Zip _____ * 0% Tax
Phone _____ Payment _____
CC # _____ Enclosed _____
Exp. Date _____ (\$30.00 Min. Credit Card Order) **NO COD's**
Signature _____ **OR PO's**

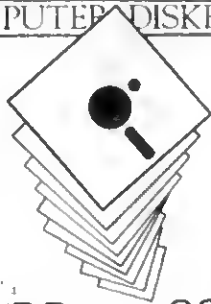
For Traceable Shipments, UPS \$5 per 10 disks — U.S. Mail \$10 per 10 disks
Canada & Overseas, Add \$10 Shipping

PUBLIC DOMAIN SW

3080 Olcott St. B 130, Santa Clara, CA 95054
(Phone Orders) 408-988-0230



GT ENTERPRISES COMPUTER DISKETTES



5 1/4
DS/DD
\$.99 each

5 1/4
SS/DD
\$.90 each

LIFETIME GUARANTEE

Individually Tested 100% Error Free
Reinforced Hub Rings Write Protect Tabs
Color ID Labels and Tyvek Envelopes Included

Add \$3.00 shipping per 100 or fewer diskettes
WA Residents add 8% sales tax

PRICED FOR DISCOUNT

100% OFF MasterCard & Visa Accepted

MAIL ORDERS

Lowest Prices & Money Orders, or cash, money order, or personal check (allow 4-6 weeks for processing)

GT ENTERPRISES

2400-SW 325th Street, Federal Way, WA 98023

To Order, Phone Our 24 Hour Toll Free Line

1 (800) 828-2828, Ask For Ext. 525

Specific Questions and Inquiries

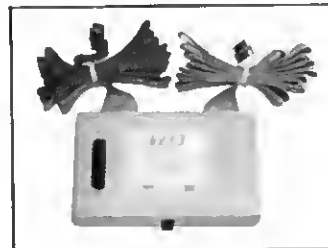
(206) 838-5107

Computer Stores ask about our wholesale and private labeling service

WHY FIGHT IT?..SWITCH!

THAT'S RIGHT—Why fight twisted cables and hidden connectors any longer when a TABCo Switch can fix the problem forever! Designed & built in USA.

SR-1 Serial A/B switch with a switchable Null Modem Adapter and six foot connector cables built-in. Lines 2-6, 8, 20 & 22 are switched. Top quality material and workmanship make this a super buy at only **\$79.95**



Model PSM-2C/P makes connecting two computers to a single parallel printer a snap! Just plug in your existing printer cables to the switchbox and connect the built-in six foot cable to your parallel printer and you're set. Order today.

New Low Price! \$99.95

Other models available
Dealer inquiries invited
\$2.50 Shipping/Handling
Florida residents add 5% sales tax



**704 W. Michigan Ave. P.O. Box 8098
Pensacola, FL 32505 Florida 904/438-6507
OUR TOLL FREE NO. IS
1-800-874-1551**

ACCOUNTING FOR MICROS

\$325 Set of Three

ACCOUNTING FOR MICROS is a set of integrated accounting programs which meet professional standards. They're fast and easy to use, with complete instructions. Our manual (shown above) also includes helpful information on bookkeeping and computers.

GENERAL LEDGER \$125

Allows up to 1,000 accounts & 1,000 transactions/month. Retains month-end balances for Last Year, This Year and Forecast. Includes Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summary and Journal Report.

ACCOUNTS RECEIVABLE \$125

Allows up to 2,500 customers and 1,000 invoices per month. Invoicing can access Inventory Module. Keeps customer names and addresses. Invoice prints on plain paper or any pre-printed form. Statements can be printed at any time.

INVENTORY \$125

Allows up to 4,000 parts. Keeps 3 month history of unit sales as well as year to date. With AR, can

be used as point of sale system (prints invoices, handles cash). Reports include Inventory Value and Stock Report, Internal and Customer Price List.

ACCOUNTS PAYABLE \$125

Allows up to 500 vendors and 600 invoices/mo. Records invoices and handwritten checks. Prints computer checks on any pre-printed form. Keeps vendor names and addresses.

PAYROLL \$125

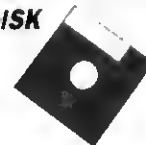
Will handle up to 100 employees with six deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately.

RUN ON MOST CPM AND MSDOS

Apple CPM	IBM PC XT PC AT	Sony (all)
Columbia	Kaypro (all)	Tandy (all)
Compaq	Morphy (all)	TeleVideo
Osborne	Osborne (all)	Zenith 100 & 150
Eagle	Panasonic	5" CPM
Epson QX-10	Radio Shack CPM	Other compatibles

\$465 Set of Five

DEMO DISK
\$18.00



Try all 5 programs above (GL, AR, AP, IN, PRI). Order our DEMO DISK for \$18.00 (includes shipping). Condensed versions of the programs give you the "feel" of data entry and access. Includes sample reports and instructions. Specify machine.

SET OF FIVE \$465
SET OF FOUR \$395
SET OF THREE \$325

HOW TO ORDER: Please specify machine and disk format. You can pay by check, by VISA or MasterCard (we need your expiration date and card number), or by UPS COD (add \$2.50 COD charge). Our price includes shipping. Minnesota residents, add 6% sales tax. We ship most orders the same day.
or **ORDER BY PHONE: 612-339-2521**

James River Group
INCORPORATED



(612) 339-2521

125 North First Street
Minneapolis, MN 55401

\$777

NEW!



**Comes complete with cable
and choice of software driver*
(CPM, LDOS, TRSDOS)**

5 MEG HARD DRIVE

10 Megabyte Hard Drive.....	\$899
15 Megabyte Hard Drive.....	1095
30 Megabyte Hard Drive.....	1495

SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
- One Year Parts & Labor Warranty
- Size Rated After Format
- Continuous Duty Power Supply
- Error Checking & Correcting
- Continuous Duty Fan
- Size 11.5" x 12.5" x 5.0"
- All Contacts Gold Plated

*Model 3 requires LDOS

Model 4 requires TRSDOS 8.2 or Montezuma Micro CPM 2.2

There are firms which offer benefits, experience or products seemingly too good to be true. Now why would you want to expose yourself to unhappiness when Aerocomp has a proven record of thousands of happy, satisfied TRS-80 customers. Just take a minute to look through back issues of this magazine. You won't find many companies that have been around as long as Aerocomp. We fully support TRS-80 computers and most all operating systems including CP/M 2.2. Aerocomp leads the way to low hard disk prices so you can afford to enjoy the benefits of increased storage and faster disk I/O. These units are precision engineered, tested and delivered complete and ready to use, right from our stock. Each unit is guaranteed for one year parts and labor. You can count on us to be here if you should ever need us. As always, your satisfaction is assured with our 14 day free trial offer. If, for some reason, you are dissatisfied with our drive merely return it for a full refund (less shipping). How can you go wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today! Call our toll-free number now!

See opposite page ▶▶▶▶▶

MODEL I DOUBLE DENSITY BOARD

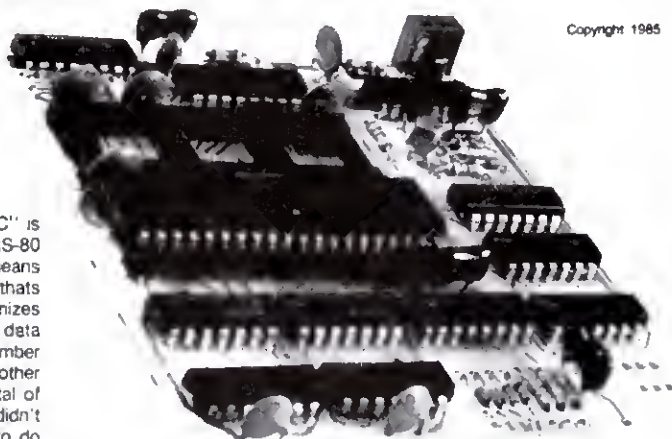
**Add 80% more capacity to your disk
system with the Double Density
Controller (DDC) from Aerocomp.**

The Story

Some products have what it takes to seem to last forever. Our "DDC" is one of those products. What it does is allow you to operate your TRS-80 Model I disk system in double density. In this case double density means almost doubling the storage capacity of your diskettes. Single density, that's the way Radio Shack designed your Model I expansion interface, organizes your disk into 10 sectors per track. Each sector contains 256 bytes of data for a total storage capacity of 2,560 bytes or 2.5K per track times the number of tracks your drive is capable of addressing. Double density, on the other hand, writes 18 sectors per track each containing 256 bytes for a total of 4,608 bytes or 4.5K. That is 80% more data in the same space. Why didn't Radio Shack do that in the beginning, you ask? Well it costs money to do double density because it is more difficult to do than single density and the data is harder to capture reliably. That means more cost and the Model I was meant to be a low-cost computer for the masses. Therefore, no double density for the original Model I.

The Facts

Other companies introduced double density controllers for the Model I but they were not so good. We waited and waited but, even new models failed to correct problems with data separation that kept cropping up. So we went to work and came up with a new design to cure the old problem. At last! A double density controller for the Model I with a higher probability of data recovery than with any other double density controller on the market then or since. Our analog design phase lock loop data separator has a wider capture window than the digital types the others use. This allows high resolution data centering. Our "DDC" analog circuit allows infinitely variable tuning. The attack and settling times are optimum for 5.25" diskettes. The oft-stated fears of adjustment problems rumored by digital dilettantes have been proved groundless by thousands of satisfied users the world over. The bottom line here is state-of-the-art performance and reliability.



Copyright 1985

ORDER YOURS TODAY

TRS-80 Model I disk system owners who are ready for reliable double density operation will get 80% more storage per diskette; single and double density data separation with far fewer disk I/O errors; single density compatibility; simple plug-in operation. You will need a disk operating system that has the necessary double density software. All the popular DOS's (except TRSDOS) have the drivers. We have put together two special packages in the event you don't already have one of the more popular DOS's.

Please add \$4 handling & shipping

"DDC" by itself.....	\$ 99
"DDC" and LDOS.....	159
"DDC" and NEWDOS 80 2.0....	179

- ☐ 40 Track
- ☐ 80 Track
- ☐ Single Head
- ☐ Dual Head
- ☐ Bare
- ☐ Complete
- ☐ Full Size
- ☐ Half Size

DISK DRIVES

Aerocomp leads the way to the BEST value in disk drives and related peripheral products on the market today. Sound engineering, high performance, quality construction, no-risk free trial, outstanding warranty service and a reputation for doing the right thing make your decision to buy Aerocomp the correct one. Please look over our offerings and make your selection. When you have made your choice call our toll-free number and place your order. If you need assistance in making your selection, please call our information number. It's listed in the box at the bottom of this ad along with the technical assistance number for those of you who want to get right to the nitty-gritty. Thanks, we all appreciate your business and will continue to do our very best to support you.

BARE DRIVES Add \$4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! These are new factory drives. No blimps, seconds or closeouts. Instruction manual included at no extra cost. Service manuals are available. See "Miscellaneous Goodies" for info.



40tk SS full size Tandon TM100-1	\$129
40tk DS full size Tandon TM100-2	169
40tk SS half high TEAC FD55-A	129
40tk DS half high TEAC FD55-B	189
80tk DS full size Tandon TM101-4	289
80tk DS half high TEAC FD55-F	239
8" SS Thinline Tandon TM848-1E	260
8" DS Thinline Tandon TM848-2E	335

8" FLOPPY DRIVES Add \$12 S&H

These 8" Thinline drives work with the Model 2 and 16 plus others that use standard drives. The rugged all-steel cabinet has an extra heavy duty power supply rated for continuous operation. A removable air filter allows only clean air to circulate. Cabinets with single drives are supplied with a blank panel to cover the unused space. A second drive can be added at any time. Service manuals are available. See "Miscellaneous Goodies" for info.



1-8" SS Tandon TM848-1E & case	\$389
2-8" SS Tandon TM848-1E's & case	649
1-8" DS Tandon TM848-1E & case	439
2-8" DS Tandon TM848-2E's & case	699

MISCELLANEOUS GOODIES \$2 S&H

Model 1 TRSDOS 2.3 disk & manual	\$25
Model 3 TRSDOS 1.3 disk & manual	25
Model 4 TRSDOS 6.2.x disk & manual	20
LDOS (specify Model I or III)	69
NEWDOS 60 v2.0 (specify Model I or III)	99
Montezuma Micro Model 4 CP/M 2.2	169
Tandon TM100-1/2 Service Manual	20
Tandon TM848-1/2 Service Manual	20
TEAC FD55A/B/F Service Manual	20
10 SSD0 disks in library box, Lifetime Guar.	16
10 DSD0 disks in library box, Lifetime Guar.	19
5.25" drive power supply & enclosure	59
8" drive pwr sply & end w/1an 5V-24V	150
5.25" 1-drive cable, a nice length	19
5.25" 2-drive cable, a 44 inch	24
5.25" 3-drive cable, just the right size	29
5.25" 4-drive cable, the top dog	34
5.25" Extender cable with gold contacts	10

COMPLETE DRIVES Add \$6 S&H

Fits TRS-80 Models 1,3,4 and the Color Computer plus the others that use standard drives. The drive of your choice is mounted in a sturdy, all-steel cabinet. An external gold plated drive connector allows cabling without disassembly of the cabinet. Half-high drives come in a full-size cabinet that will hold and power our half-high drives. Single drives have a panel covering the unused space allowing a second drive to be added at any time. All are shipped fully assembled ready to use. Specify silver or white enclosure.



40tk Single Side full size (TM100-1)	\$189
40tk Double Side full size (TM100-2)	199
80tk DS full size (TM101-4)	299
1-40tk SS half-high FD-55A in dual case	169
2-40tk SS half-high FD-55A's in dual case	319
1-40tk DS half-high FD-55B in dual case	199
2-40tk DS half-high FD-55B's in dual case	359
1-80tk DS half-high FD-55F in dual case	219
2-80tk DS half-high FD-55F's in dual case	389

FREE TRIAL OFFER

Use your Aerocomp hardware product for up to 14 days. If you are not satisfied for ANY REASON (except misuse, damage or improper handling), return it (insured) in the original shipping container for a full purchase price refund, less shipping. Sorry, this offer does not apply to software. Defective software will be replaced. Any hardware/software specials will be prorated and the software will be charged at the regular unbundled price. We have confidence in our products and we know you will be satisfied.

WARRANTY

We offer a one year warranty on parts and labor against defects in materials and workmanship. In the event service becomes necessary for any reason you will find our service department fast, friendly and cooperative. We want to keep you happy. Out of warranty repairs are also available.

100% BURN-IN and TEST

All our products are burned-in and fully tested prior to shipment. We want you to receive an item ready-to-go. AEROCOMP means reliability!

ORDER NOW!

Call our toll-free number service and place your order. Have your American Express, Mastercard or Visa number ready. We will not charge your card until the day we ship your order. You may order by mail using your credit card, check or money order. Personal and company checks are welcome and cause no shipping delay as long as they are bank printed and the signature exactly agrees with the name printed on the check. We will ship surface COD with no deposit but all COD's require cash or a cashier's check on delivery. Texas residents add 6% State Sales Tax. No tax collected on out of state shipments. Canadian addresses add \$20 to your order if over \$550 for customs documentation.

TRS-80 Model III & 4 DISK CONTROLLER and DRIVE KITS

Convert your cassette Model III or 4 to disk operation with one of our complete kits. You receive our own advanced disk controller board with gold plated edge contacts capable of 4-drive operation; our own power supply; plated steel mounting towers complete with RFI shield plus all the cables and hardware necessary. Detailed instructions are included. All you need is a screwdriver and a pair of pliers. System kits come with 40 track single-side drives or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT\$199

(Everything you need - less drives/CDS)

1 DRIVE SYSTEM.....319

2 DRIVE SYSTEM.....439

Add \$8 S&H

MOUNTING KIT & POWER SUPPLY.....95

Add \$6 S&H

CONTROLLER BRD. ONLY..110 RS-232 BOARD & KIT.....69

Add \$4 S&H

OUR FAMOUS MODEL I STARTER PACKAGE

If you have a Model I and an Expansion Interface this is what you need to get started with disks. Included is one 40 track single-side disk drive complete with matching silver case and power supply, a 2-drive cable, a TRSDOS 2.3 disk operating system and TRSDOS manual plus all insurance and delivery charges to your door (lower 48 states).

Yours for only **\$199**

You can add our renown "DDC" double density controller to either the Radio Shack or the LNW Expansion interface for 80% more storage capacity on your drive. Order it at the same time as our starter package above and we'll pay the shipping. Go ahead, you deserve increased density. See the opposite page for the latest technical details.

\$99

CALL TOLL-FREE

800-527-3582 USA
800-442-1310 TEXAS

For inquiries or information
or to check on or change an order
call 214-339-9324

AEROCOMP
Redbird Airport, Bldg. 8
P.O. Box 24829
Dallas, TX 75224

Continued from p. 34

Teach Your TRS-80 Some New Tricks

by Terry Kepner

★★★★

Teach Your TRS-80 To Program Itself by David Busch. Tab Books Inc., Blue Ridge Summit, PA 17214. ISBN 0-8306-1798-1. \$11.50. A disk of the programs costs \$16.

Writing: ★★★★★
 Organization: ★★★★★
 Thoroughness: ★★★★★
 Understandability: ★★★★★

While *Teach Your TRS-80 to Program Itself* doesn't really do what the title implies, it does reduce some of the drudgery involved in writing programs by supplying modules and utilities that do part of the work for you.

For example, designing visually appealing program menus is always a chore: You have to count message lengths and put in tabs to center the text horizontally, then center it vertically. That task would be much simpler if you could design a screen with a word processor and tell a program to generate the code necessary to reproduce that screen.

Your computer can do this and dozens of other similar tasks, but it doesn't. That's where Busch's book comes in. It provides programs that do the task mentioned above and more. In all, *Teach Your TRS-80* provides 16 utilities to simplify your programming. *Teach Your TRS-80* is designed for the NEWDOS/80 system, but you can use it with most other DOSes. The programs work on the Models I and III and the Lobo Max-80.

The Programs

In addition to the screen formatting utility cited above, *Teach Your TRS-80* includes a word counter to determine the number of words in a text or ASCII file, a boiler-plate data base management generator, a print routine that prints out programs with a right-hand margin and indented continuation lines, a master menu program that lets you load and run any one of 26 programs, and an error-trap routine you merge with your programs so you get full text explanations instead of just "illegal function call" errors. There are also programs that let you specify DOS or program zaps and check for entry errors before invoking the fixes, that let you program in Spanish, and a utility that scans text files and produces a list of the words used (for indexes and glossaries).

Teach Your TRS-80 also includes utilities to remove remark statements from

a program, automatically add a title to your programs (for copyright statements), scan your program and automatically calculate the tabs needed to center indicated prompts and messages, generate program documentation, and proofread your programs for syntax errors in Basic reserved words. You can also create a graphics screen (mixed alphanumeric and graphics blocks) for visual presentations, and scan your program for a specified string and replace it with a new one (global search and replace).

Some of these programs require that you answer some prompts. The boiler-plate data base manager asks you a few questions about the size of your data, how you want it stored, the number of menu choices, and so forth. From this information, you create a boiler-plate program with a main menu, disk save and load capabilities, and screen-clearing code already in place. All you add are the data input, update, and start routines.

The master menu program is simply a program in which you put the names of frequently used programs (such as the ones in this book) and use it to select the particular one you want to use at a given time (sort of a disk menu program).

The chain zap program is designed mostly for NEWDOS/80 users, but you can adapt it to other DOSes. When you run it, you specify the file you want zapped, the starting location of the zap, and the replacement code. After you finish specifying these parameters, the program creates a chain file that automatically loads the NEWDOS/80 zap program and steps through the entire zap procedure. This is a real time-saver and much more accurate than trying it yourself, especially if you're not sure how to use the NEWDOS/80 zap program.

Compatibility

You can adapt many of *Teach Your TRS-80*'s concepts. If not the actual programs, to other computers. The only problems will be with the programs that use the PEEK command to read the screen (the screen editing program and the graphics screen program) and the error-trap program (the error numbers will be wrong).

Conclusion

As far as program errors are concerned, I found remarkably few in either the text or the programs. For convenience, a variables list, with explanations, comes with each program so you can easily make alterations. Overall, I liked the book very much. And while the book doesn't really teach your computer to program itself, it provides enough useful programs to make it a worthwhile purchase. ■

Getting Some Answers

by Gary A. Shade

★★★★

Brainstormer runs on the Model III (48K) and requires two disk drives. Soft Path Systems, c/o Cheshire House, 105 N. Adams, Eugene, OR 97402. 503-342-3429. \$75 single-user license; \$100 institutional license.

Easy to use: ★★★★★
 Good docs: ★★★★★
 Bug free: ★★★★★
 Does the job: ★★★★★

If you've ever been stuck with a problem and couldn't figure out a solution, *Brainstormer* can help. It's a combination thought organizer and mind jogger that lets you figure possible solutions to problems. *Brainstormer* provides a structured environment in which you break a problem down into its component parts and indicate factors that affect those parts. By pairing a problem's components and influences in different combinations, *Brainstormer* gives you new insights and perspectives on the problem.

While I found the program well thought out, its rigid structure limits its flexibility in suggesting problem solutions.

Starting Out

Figure 1 demonstrates how *Brainstormer* considers a problem. First, you name the problem of interest. I wanted to use *Brainstormer* in my job as a systems integrator to figure out the different ways I could combine computer products from various manufacturers into a complete system.

Once you state the problem, you define components of the problem ("themes") and factors that affect those components ("variations"). You can define up to 10 themes (each with up to 10 relative factors) for a maximum of 3,628,000 permutations. The program refers to these permutations as probes.

Figure 2 lists the themes I used in testing *Brainstormer*, the hardware that comprises a computer system. Figure 3 contains the different types of central processor to which I have access (those with VME-bus CPU boards that Motorola, Signetics, and Mostek manufacture). Figure 4 represents the program's final suggested solution for integrating a system.

The probability of a particular CPU card appearing in a given configuration is 1 in 10 (.010) because I listed 10 different cards. You can edit these probability numbers to prohibit a variation from appearing in the probe by setting the prob-

1 Problem of Interest Themes --> Variations --> Probes

1	xxxxx		
	1	xxxx	
	2	xxxx	
	--		1
	--		
	10	xxxx	
2	xxxx		
	1	xxxx	
	2	xxxx	
	--		2
	--		
	10	xxxx	
--			3
--			4
--			5
--			6
--			7
--			8
--			9
10	xxxx		
	1	xxxx	
	2	xxxx	
	--		10
	--		
	10	xxxx	

Figure 1. The levels at which you can state a given problem using Brainstormer.

ability to zero. Naturally, the sum total of all the probabilities must equal 1.

You can easily move about within the program by selecting the proper screen or area of the program. You execute commands through the mode screen with a help screen explaining the mode commands. Brainstormer controls disk access through a file screen and a separate help screen elaborates on the file commands.

Negatives

Although the software was helpful in providing additional ways to view a problem, it really did nothing more than mix and match themes and variations. I found this two-dimensional matrix of combinations limiting in describing large and complex problems.

Also, since you're limited to 10 themes and variations each, you're further restricted in certain applications, those where the total number of themes or variations exceeds 10.

In the application I used, I could easily expand the total number of themes by including specialized board-level products, like optically isolated digital input and output modules or tape controllers. In fact, I couldn't configure a complete system with the 10-theme limitation Brainstormer imposes.

I would suggest that after you buy Brainstormer you read the manual from

Theme : CPUBoard Max probes: 3,828,800

Variation number	Variation name	Variation probability
1	MVME 110-1	0.10
2	MVME 101	0.10
3	MVME 115M	0.10
4	MVME 120	0.10
5	MVME 128	0.10
6	MVME 130	0.10
7	SMVME 2000	0.10
8	SMVME 2010	0.10
9	VME-SBC	0.10
10	MK75602	0.10

Theme command : MFACORO?

Figure 2. Theme screen for making a system configuration.

Interest : System configurations

Max probes: 3,828,800

Theme number	Theme name	Number of variations
1	Host computer	3
2	Remote system(s)	4
3	CPU board	10
4	RAM board	9
5	System controller	4
6	Serial board	4
7	Parallel board	7
8	Mass storage controller	5
9	Disk drives	6
10	Printer(s)	0

Interest command : MIFACDO/NQ

Figure 3. Variation screen of the CPU boards.

Probe for interest area : System configurations

Theme	Variation
Host computer	VME/10
Remote system(s)	ISI 5160
CPU board	SMVME 2000
RAM board	MVME 211
System controller	MVME 050
Serial board	MVME 331
Parallel board	MVME 625
Mass storage controller	MVME 320
Disk drives	TM 65-4L

Probe command : MFGCO?

Figure 4. A probe by Brainstormer of a possible system configuration.

beginning to end as you use it. Completely work the examples presented before attempting to enter your own application file. You'll find the process of stating and working with a particular problem much easier after working with the examples provided.

Conclusion

I would recommend Brainstormer to those who can state their problems

within the program's constraints. The manual states that you can use the program in two areas of the problem-solving process: problem description and idea generation. Strategy selection, testing, and implementation are left to more specialized software.

Brainstormer's concept is fascinating, but I wish that the authors had taken Brainstormer to a level beyond the simple permutations. ■

The Offix Personal Office System

★★★★★

The Offix Personal Office System runs on the Tandy 2000 (256K) and requires two disk drives. Emerging Technology, 2031 Broadway, Boulder, CO 80302. Radio Shack catalog number 26-5325. \$99.95.

Offix integrates a word processor, file manager, and report generator in a single package. It features a clever display of drawers and filing cabinets on-screen, making it easy to find and search through your files. The most surprising thing about Offix is that it doesn't have any external documentation and doesn't need any.

To use Offix, you open the drawers and flip through the folders, take a folder out, and open it to see what's inside. The folders contain either text files or forms.

A function key calls up a help screen for the current operation, while a pop-up menu summarizes the commands available for the next operation.

Offix's full-featured word processor provides advanced features like block move/copy, document merge, full cursor control, and complete page formatting.

You use Offix's word processor to design the data base forms. Each folder contains one blank form you can modify without losing information on the other records in a file.

Offix's forms selection and reporting features are particularly powerful and an unexpected plus in such an inexpensive package. You generate reports by indicating on a blank form what information you want to retrieve. You can select records for review or for either the report generation system or form letters.

While Offix supports Tandy printers, I don't appreciate their philosophy of not supporting non-Tandy printers for their software.

Offix is software protected, requiring the master disk in drive B to load the software properly. There is no restriction to copying the software to a back-up disk or to a fixed disk but you still have to put your only master in the computer each time you use Offix.

Color implementation on the Tandy 2000 uses the high-resolution graphics color mode and is slow. If you use this mode with any MS-DOS version other than 2.11.XX, you'll surely return to black-and-white mode.

Offix's ease of operation is due in large part to its superior tutorials and help files. It's perfect for people who don't have a lot of time to learn an advanced system.

—John B. Horrell III

IDEA!

★★★★★

IDEA! runs on the Models 100 and 200. Traveling Software, 11050 Fifth Ave. N.E., Seattle, WA 98125. \$49.95.

Just as a word processor stores, manipulates, and organizes words, so **IDEA!** handles ideas. It provides a framework for generating organized lists. You can add as many levels as you need, with as much room for elaboration as you require. **IDEA!** copies, moves, expands, or deletes any particular item and sub-ideas associated with it.

You receive a package of three programs—one provides the full-featured **IDEA!** package (9.5K); another is a smaller version (8K) with fewer features; and the third is a memory-management program, **MEMMGR** (2.5K), for managing .DO files. **MEMMGR** lists **IDEA!**'s file names and their sizes with easy-to-use options for making the files invisible, visible, and renaming or killing them.

Like the Model 100/200 built-in software, **IDEA!** is simple and logical in operation. You invoke all commands with function keys.

The primary difference between the Model 100 and the Model 200 versions is that the Model 200 version lets you see more headings at one time and view two paragraphs simultaneously (but you can only edit one at a time).

Unfortunately **IDEA!** has several problems. The first is size. The program uses almost 12K when running (not counting the size of the file you're editing), severely restricting its use with other files or programs in memory. In fact, you can't load **MEMMGR.BA**, **IDEA!.BA**, and the **IDEAS.DO** sample file in the same memory bank on the Model 200.

The second problem is speed. As your files get larger (8K or more), you'll notice a marked reduction in speed. This is due primarily to using Basic instead of machine-language for **IDEA!**.

I like **IDEA!** despite its problems and recommend it to anyone who must make lists or wants to organize ideas, plans, or their writing. Its organizational advantages outweigh its disadvantages. I just wish I could get a version for my Model 4P so I could directly swap files between the Model 100 and my desktop.

—Terry Kepner

Homeword

★★★★★

Homeword runs on the Tandy 1000 and 1200 (128K) and requires two disk drives. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. Radio Shack catalog number 25-1116. \$69.95.

If you feel that DeskMate's word processor doesn't cut the mustard, but you don't want to shell out much money for a replacement, consider **Homeword**. **Homeword** is inexpensive but powerful and capable of performing extensive word processing.

Menu-driven **Homeword** uses icons to represent printer control, document layout, customizing, file manipulation, editing, and program exit. (The control key with other keys alternatively provides the same functions.) Each icon has a submenu of special functions.

The display starts out in 40-column text mode with a small box in the lower right-hand corner called the Page Sketch section. This displays a miniature representation of your printed page, with the selected margins and spacing assignments.

The Print icon displays submenu selections consisting of document printing, dumping to the screen, printing to disk, and selecting the starting page number. Some of these selections require you to go to the Customize menu and answer specific setup questions.

The Edit icon lets you erase, copy, move, find and/or replace and insert erased text. **Homeword** highlights the text so you know exactly how much to erase or edit.

The File icon takes care of all normal document file-handling tasks such as retrieve, save, erase, and insert documents. You use the arrow keys to scan the directory, and hit the enter key to select documents.

The Layout icon lets you dictate document alignment, top/bottom margins, line spacing, tab stops, side margins, headings/footings, and page numbering. You can also select the print style such as boldface, normal, and underline.

With the Customize icon, you can change the selected document drive (A or B), make back-up documents, toggle 40/80-column text, assign the type of printer, and change preset layout or margins, and tabs. You may also save any customized setup to disk to use at a later date.

Function keys invoke special functions such as changing the current directory. File conversion utilities are also supplied with which you can convert non-**Homeword** files to use with **Homeword** and vice versa. Which conversion routine you use depends entirely on the type of document you're converting.

Homeword is easy to learn and use, bug free, and the addition of an audio instruction cassette is an excellent idea. The manual is well done and to the point. This is a very capable word processor at a reasonable cost.

—David Engelhardt

EXPRESS CHECKOUTS

Inside CP/M Plus: A Guide for Users

★★★★★

Inside CP/M Plus: A Guide for Users.
By David Cortesi. Holt, Rinehart, and
Winston. 383 Madison Ave., New York,
NY. \$18.45.

David Cortesi has written extensively on CP/M and his earlier books were invaluable guides to this hard-to-use operating system. His new book takes you on a detailed tour of this new version of CP/M and I found it well suited to the beginner.

Inside is organized into three parts: a basic introduction to computer hardware and software, an introduction to the operating system with simple commands and their applications, and detailed explanations of the more difficult concepts in CP/M Plus.

The first two sections tell you how a computer works and how to make it start working for you. They introduce you to simple commands and their functions, like DIR and Date, with numerous examples to help you understand the other commands available.

You learn other more complex commands as you explore the file system, such as extensions to DIR and other commands that let you use the file structure to your advantage.

Cortesi fully explains complex commands in CP/M Plus so you can use your system to its fullest capacity (such as file attributes and user areas).

PIP (peripheral interchange program) is a difficult utility to understand because it's far more than a simple copying utility. This powerful utility is clearly explained with particularly useful examples.

Many operating systems can automatically execute system commands, but few books really explain that process well. Cortesi not only addresses the use of Submit, he follows up with examples to illustrate its features including the complex concepts of parameters, special characters, conditional command lines, and program input from the command file.

The last part of the book covers advanced topics of system management: disk organization, data integrity, and data security. If you haven't used a computer before, this area is particularly helpful and points out many ideas for your implementation.

I thoroughly enjoyed reading another of the fine works on CP/M by David Cortesi. He avoids using unnecessary terminology and clearly identifies all aspects of the system. He makes CP/M Plus easy to understand.

—John B. Harrell III

Circle 303 on Reader Service card.

MODEM80 Communications Package

The most complete and versatile communications package of its kind.

Available versions are:

TRS-80 I/III only \$39.95 + \$2.00 S&H
LOBO MAX80 only \$49.95 + \$2.00 S&H
TRS-80 4/4P only \$79.95 + \$2.00 S&H

All versions are supplied on 5 1/4" disk and include full documentation

For additional information or to order contact:

The ALTERNATE CHOICE

9505 W Brown Deer Rd.
Milwaukee, WI 53224
(414) 355-4544

C.O.D. service available for a \$3.00 additional charge. Sorry no charge cards.

Circle 239 on Reader Service card.

DIGITAL and ANALOG I/O PORT KITS

Parallel 8 bit Input & Output
for your Models I, III, 4 & CoCo

- Modular design for ADDITION of multiple ports
- LATCHED OUTPUT
- STATUS MONITORED BY LEDS
- SWITCH SELECTABLE I/O ADDRESS
- SOFTWARE DIAGNOSTICS

Complete I/O port kit (J107K) \$35
A-D/D-A Interface (J202K) \$35
CoCo Adapter—required for CoCo (J110K) \$15
Model III, 4 Adapter (J112K) \$20
5 Volt Power Supply (D100K) \$25
Complete Enclosure Kit (D100E) \$30

One FREE POWER SUPPLY with every four I/O Port Kits Ordered!
Add 30% for assembly.

Send check, money order, or C.O.D.

D & A RESEARCH

400 Wilson Avenue
Satellite Beach, FL 32937
305/777-1728

Circle 336 on Reader Service card.

Micro Data Products 1-800-423-5414

maxell BASF

MD-2 DSDD	5 1/4" 2.16	Box of 10	DS DD 1.65 S%
MD-1 SSDD	5 1/4" 1.50	—	SS DD 1.45 S%
MD-2 DSDD	5 1/4" 1.75	Bulk Packaging	DS DD 1.36 S%
MD-1 SSDD	5 1/4" 1.45	—	SS DD 1.20 S%

MAXELL

3.5" 4.36 5% DSHD 4.10
Pre Paid COD's accepted
Orders shipped within 24 hours
Shipping & handling charges vary
TN. residents add 7.75% sales tax
In TN. call 1-615-553-0521
545 Haymarket Rd. Clarksville,
TN 37043
Prices subject to change

Circle 207 on Reader Service card.

wabash®

When it comes to
Flexible Disks, nobody
does it better than
Wabash.

MasterCard, Visa Accepted.
Call Free: (800) 235-4137



PACIFIC
EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 (In Cal call
(805) 543-1037)

Circle 422 on Reader Service card.

Word Processing SIMPLIFIED

for SuperSCRIPSIT

IDEAL CLASSROOM TEXT FOR WORD PROCESSING

The simple instruction book use with TRS-80 III, IV, IVP
CLEAR, SIMPLE, EASY

- home
- office
- education

All you need is a superSCRIPSIT diskette.

ORDER NOW Kelly Enterprises **MASTERCARD & VISA accepted**

Send check or MO for P.O. Box 247

Hot, MI

\$19.95

48842-0247

ADD \$2.50 Shipping/Handling



CALL
517-694-1799
24 hours

```

61182 DIM Q18(21); FOR Q18=0 TO 21: READ Q18(Q18); NEXT
Q18
61183 ;
61184 ; Routine 2 -- Strip blanks from string
61200 DATA 32717, -5902, 9038, 9086, 2818, 6, 11817,
-386, 8224, 11812, 8205, -7689, -13967
61202 DIM Q28(12); FOR Q28=0 TO 12: READ Q28(Q28); NEXT
Q28
61203 ;
61204 ; Routine 3 -- Convert to upper case
61300 DATA 32717, 17938, 32291, 26147, 32367, 25086,
1848, 31742, 816, 24558, 9079, -3824, 201
61302 DIM Q38(12); FOR Q38=0 TO 12: READ Q38(Q38); NEXT
Q38
61303 ;
61304 ; Routine 4 -- Full Screen Input
61600 DATA 3646, 13261, -13056, 73, 8190, -2528, 281
61602 DIM Q6(5); FOR Q6=0 TO 5: READ Q6(Q6); NEXT
Q6
61603 ;
61604 ; Routine 18 -- Screen Swap Use ONLY on a Model
4/4P in Model III Mode!
61701 DATA 32717, 15882, -11588, -20688, 7627,
-11409, 6028, 5911, -11487, -13943
61702 DIM Q9(9); FOR Q9=0 TO 9: READ Q9(Q9); NEXT
Q9
61703 ;
61800 ; Create space for necessary variables;
61801 Q18=1; Q28=1; DIM Q5(16); RETURN

```

End

Program Listing 3. Assembly-language source code for Model 4 subroutines.

```

88100 ; *****
88110 ; MODEL 4 -- Subroutines for Basic programs
88120 ; *****
88130 ; SVCs used
88140 BOSP EQU 2
88150 BFLAGS EQU 181
88160 BKEY EQU 1
88170 BKEYIN EQU 9
88180 BVDCCTL EQU 15
88190 ;
88200 ; Model 4 -- Formatted input routine
88210 ; Calling sequence: CALL ROUTINE (18)
88220 ; It is varptr of string of proper length+1
88230 ; Be sure that cursor position is set before CALL
88240 ;
88250 ;
88260 ORG 8F180H
88270 LD A,(HL) ;Point HL to string varptr
88280 INC HL
88290 LD H,(HL) ;MSB in H
88300 LD L,A ;LSB in L
88310 PUSH HL ;Save address of varptr
88320 LD B,(HL) ;Get length+1 in B
88330 INC HL ;HL=> string address
88340 LD A,(HL) ;Move address to HL
88350 INC HL
88360 LD H,(HL) ;MSB in H
88370 LD L,A ;LSB in L
88380 DEC B ;B = input len
88390 PUSH BC ;Save input length

```

```

88390 ;
88400 BC ; twice
88410 LD C,' ' ;C holds field character
88420 ;
88430 LD A,BOSP ;Set up for SVC call
88440 RST 28H ;Call BOSP SVC
88450 DJNZ F1 ;Display input field
88460 ;
88470 BC ;Recover field length
88480 LD C,18H ;C holds backspace character
88490 ;
88500 LD A,BOSP ;Set up for SVC call
88510 RST 28H ;Call BOSP SVC
88520 DJNZ F2 ;Backspace to beg. of field
88530 ;
88540 BC ;Recover field length
88550 LD A,BKEYIN ;Set up for SVC call
88560 RST 28H ;Set DOS handle input
88570 ;
88580 JR C,FERROR ;Go if <break> pressed
88590 JR H2,FERROR ;Go if input error
88600 LD A,B ;Else get input length in A
88610 JR F3 ;And jump over
88620 LD A,0 ;No string if <break> or <error>
88630 POP HL ;Recover varptr address
88640 LD (HL),A ;Set length of string
88650 RET
88660 ;
88670 ; MODEL 4 -- Strip trailing blanks from string
88680 ; Calling sequence: A$ = USR(A$)
88690 ;
88700 ORG 8F200H
88710 PUSH DE ;Save varptr address
88720 EX DE,HL ;And move to HL
88730 LD C,(HL) ;String length in C
88740 INC HL ;HL=> string address
88750 LD A,(HL) ;Move string address to HL
88760 INC HL
88770 LD H,(HL) ;MSB in H
88780 LD L,A ;LSB in L
88790 LD B,8 ;BC = String length
88800 ADD HL,BC ;HL=> End of string+1
88810 DEC HL ;HL=> last char. of string
88820 ;
88830 LD A,(HL) ;Get character in A
88840 CP ' ' ;Is it a space?
88850 JR HZ,S2 ;Go if not
88860 DEC HL ;Else move back a character
88870 DEC C ;Decrement count
88880 JR HZ,S1 ;Loop back until done
88890 ;
88900 POP HL ;Recover varptr address
88910 LD (HL),C ;Set new string length
88920 RET
88930 ;
88940 ;
88950 ; MODEL 4 -- Change all lowercase characters to
uppercase in a string
88960 ; Calling sequence: A$ = USR(A$)
88970 ;
88980 ;
88990 ORG 8F300H
89000 EX DE,HL ;HL=> string varptr
89010 LD B,(HL) ;String length in B
89020 INC HL ;HL=> string address
89030 LD A,(HL) ;Move address to HL
89040 INC HL
89050 LD H,(HL) ;MSB in H
89060 LD L,A ;LSB in L

```

Listing 3 continued

01070	LD	A,(HL)	Get character in A
01080	CP	'a'	Less than 'a'?
01090	JR	C,02	Go if yes
01100	CP	'z'+1	Greater than 'z'?
01110	JR	NC,U2	Go if yes
01120	JR	NC,U2	Else change to lowercase
01130	AND	(BL),A	And put back in string
01140	LD		
01150	INC	HL	Point to next character
01160	DJNZ	U1	Repeat for entire string
01170	RJT		
01180			
01190			
01200			
01210			
01220			
01230			
01240			
01250			
01260			
01270			
01280	ORG	BF68BH	
01290	LD	A,BPLAGS	Set for BPLAGS SVC
01300	RST	28H	BPLAGS address to IY
01310	LD	A,(HL)	Get LSB of n's value
01320	SUB	1	IC flag if 0, Z flag if 1
01330	LD	A,(IY+'K'-'A')	Get KPLAGS value
01340	JR	C,RESET	Go if reset request
01350	JR	Z,SET	Go if set request
01360			
01370	BIT	5,A	Test current value
01380	LD	A,0	Show "off"
01390	JR	Z,C1	Go if "off"
01400	DEC		Else show "on"
01410	LD	(HL),A	Load into Basic's variable
01420	INC	HL	Point to MSB
01430	LD	(HL),A	Set both bytes
01440	RET		And return
01450			
01460	RESET	5,A	Reset caps bit
01470	JR	C2	And go
01480			
01490	SET	5,A	Set caps bit
01500	C2	(IY+'K'-'A'),A	Put value back in flag
01510	LD		And return
01520			
01530			
01540			
01550			
01560			
01570			
01580			
01590			
01600	ORG	BF56BH	
01610	LD	C,(HL)	Get LSB of argument
01620	LD	B,7	Function: Set scroll protect
01630	LD	A,BVDCCTL	Set up for SVC call
01640	RST	28H	Call BVDCCTL SVC
01650	RET		
01660			
01670			
01680			
01690			
01700			
01710	EL	BF68BH	Set up for SVC
01720	RST	28H	Wait for a keystroke
01730	JR	MZ,E1	Loop back if no key or error
01740	CP	31	Was it <Shift><Clear>?
01750	RET	Z	Return if yes

```

CP      01760      26      !Nas it <Shift><Down>?
JR      01770      HZ,E2      !Go if not
LD      01780      E,A        !Save character
LD      01790      B,4        !Function: get cursor
LD      01800      A,A        !Set up for SVC
RST     01810      A,EVDCTL   !Get cursor poan in HL
LD      01820      A,H        !Row in A
CP      01830      23        !Bottom of screen?
LD      01840      A,E        !Recover character
JR      01850      Z,E1       !Get next key if at bottom
LD      01860      C,A        !Else put character in C
LD      01870      A,0DSF     !Set up for SVC call
RST     01880      2BH        !Display character in C
JR      01890      E1        !Loop back
)-----)
Model 4 -- Copy video row into string
Calling sequence: CALL ROUTINE (10,30)
It is varptr of 98-char. string
)-----)
ORG     01900
LD      01910      A,(HL)
INC     01920      HL
LD      01930      H,(HL)
LD      01940      L,A
)-----)
LD      01950      B,(HL)
HL      01960      B,HL
INC     01970      B
LD      01980      A,(HL)
HL      01990      A,HL
INC     02000      HL
LD      02010      H,(HL)
LD      02020      L,A
)-----)
LD      02030      H,(HL)
HL      02040      H,HL
INC     02050      HL
LD      02060      L,A
LD      02070      L,A
EX      02080      DE,HL
LD      02090      H,(HL)
LD      02100      L,L
LD      02110      L,L
)-----)
PUSH    02120      BC
PUSH    02130      DE
PUSH    02140      B1
LD      02150      B,L
LD      02160      A,EVDCTL
RST     02170      2BH
POP      02180      DE
LD      02190      (DE),A
INC     02200      DE
LD      02210      L
INC     02220      H
POP      02230      BC
DJNZ    02240      R1
RET      02250
)-----)
END      02260

```

Program Listing 4. Assembly-language source code for Model III subroutines.

```

*****
MODEL III -- Subroutines for Basic Programs
*****
*****
*****
Model III formatted input routine
Call: Z = USR(%) with its being varptr of
      string of proper len+1
-----
ORC          @F108H           /Get varptr in HL
CALL         GA7PH
*****
*****

```

peruunio & buisi?

```

00120 LD DE,(4020H) ;Get cursor posn
00130 PUSH HL ;Save varptr
00140 PUSH DE ;Save cursor
00150 LD B,(HL) ;P/u length
00160 DEC B ;B = input length
00170 INC HL ;HL=>string address
00180 LD A,(HL) ;Address to HL
00190 INC HL ;MSB to H
00200 LD H,(HL) ;LSB to L
00210 LD L,A ;Save length
00220 PUSH BC ;field character to A
00230 LD A,"' ;Print field character
00240 CALL 0033H ;Until field full
00250 F1 ;Recover field length
00260 DJNZ F1 ;Recover cursor position
00270 ; ;Set cursor position
00280 POP BC ;Let ROM/DOS handle input
00290 DE (402BH),DE ;Go on <Break>
00300 CALL 0040H ;Input length to A
00310 JR C,BREAK ;Skip BREAK
00320 LD A,B ;Set length to 0
00330 JR F2 ;Recover varptr address
00340 ; ;Set string length
00350 BREAK ;Recover varptr address
00360 POP HL ;Set string length
00370 LD (HL),A
00380 RET

00390 ;
00400 ;
00410 ; Model III -- Strip blanks from string
00420 ; Calling Sequence: Z = USR(I%)
00430 ; I% is varptr of string
00440 ;
00450 ORG 0F200H
00460 CALL 0A7FH ;Varptr address to HL
00470 HL C,(HL) ;Save addr. of varptr
00480 LD C,(HL) ;Get length in C
00490 INC HL ;HL=> string address
00500 LD A,(HL) ;String address to HL
00510 INC HL ;MSB to H
00520 LD H,(HL) ;LSB to L
00530 LD L,A ;BC = length of string
00540 LD B,0 ;HL=> end of string +1
00550 ADD HL,BC ;HL=> last char in string
00560 DEC HL ;Get character
00570 LD A,(HL) ;Is it a space?
00580 S1 ;Go if not
00590 CP NZ,S2 ;Else move back one posn
00600 JR HL ;Decrease char. count
00610 DEC C ;And check again
00620 DEC C
00630 JR NZ,S1 ;Recover varptr address
00640 ; ;Set new string length
00650 S2
00660 LD HL,(HL),C
00670 RET

00680 ;
00690 ;
00700 ; Model III -- Change all lowercase characters in
00710 ; string to uppercase
00720 ; Calling sequence: Z = USR(I%)
00730 ; I% is varptr of string
00740 ;
00750 ORG 0F300H
00760 CALL 0A7FH ;Get varptr address in HL
00770 LD B,(HL) ;Get length in B
00780 INC HL ;HL=> string address
00790 LD A,(HL) ;String address to HL
00800 INC HL

```

```

00810 LD H,(HL) ;MSB in H
00820 LD L,A ;LSB in L
00830 ;
00840 U1 ;Get character in A
00850 LD A,(HL) ;Less than 'a' ?
00860 JR C,U2 ;Go if yes
00870 JR C,U2 ;Greater than 'z' ?
00880 JR NC,U2 ;Go if yes
00890 AND 5FH ;Else make uppercase
00900 LD (HL),A ;And store back in string
00910 ;
00920 U2 ;Point to next character
00930 DJNZ U1 ;Repeat for entire string
00940 RET
00950 ;
00960 ; Model III -- Simple screen editor
00970 ; CALL: Z = USR(I%)
00980 ;
00990 ORG 0F600H
01000 LD A,0EH ;Cursor-on character
01010 CALL 0033H ;Print it
01020 EI ;Get a key
01030 CP 31 ;Is it <Clear>?
01040 JR NZ,E1 ;Loop back if not
01050 JR NZ,E1
01060 RET
01070 ;
01080 ; Model 4 in Model III Mode -- Swap Video Screens
01090 ; CALL: Z = USR(n)
01100 ; page brought into view is determined by
01110 ; bit 0 of n
01120 ;
01130 ;
01140 ORG 0F700H
01150 CALL 0A7FH ;Get argument
01160 LD A,0CH ;Paging value
01170 OUT (88H),A ;Send to CRT
01180 XOR A ;A = 0
01190 RR L ;Page to Carry Flag
01200 RRA ;A=0 or 80H
01210 OUT (84H),A ;Set cursor page
01220 RLA ;Page to Carry Flag
01230 RLA ;A=0 or 1
01240 RLA ;A=0 or 2
01250 RLA ;A=0 or 4
01260 OUT (89H),A ;Set page
01270 RET
01280 ;
01290 ; END

```

End

Program Listing 5. Translates machine-language routine to integer values.

```

1 'Translate machine-language routine to integer values.
Machine-language program must be in memory.
10 A% = 5HF100 ;Starting address of routine
20 B% = 5HF12C ;Last byte used by routine
30 FOR I% = A% TO B%-1 STEP 2:
V% = CVI(CHR$(PEEK(I%))*CHR$(PEEK(I%+1)))
PRINT V%:
NEXT I%

```

End



FULL SCREEN EDITOR

TRS-80 MODEL 1-2-3-4-4P-12

- * Speeds Programming
- * Corrects Errors Easily
- * Copy Unprotected
- * Become More Productive
- * Word Processor Type Commands
- * Repair Your Programs
- * Insert-Delete-Modify Characters/Words/Lines
- * Convert Program Lines to Immediate Commands
- * Duplicate Program Lines

With a few simple keystrokes, you position the cursor anywhere on the screen and key in your desired changes simply and quickly. The somewhat slow BASIC edit feature is no longer required. Go directly to the problem and make your changes. Grab a problem program line and make it an immediate statement that you entered for debugging and make it part of your program. Eliminate excessive keystrokes and save time. (Requires 2 drives to install)

Becomes part of your Radio Shack® BASIC
1-800-334-9612 U.S.-Alaska-Hawaii
1-800-922-5904 in South Carolina

MICRO-LINK

P.O. Box 2666
Sumter, SC 29151



Visa-Mastercard-COD Due to our low prices, all sales are final

Only \$33.50
Plus \$5.00 Shipping/Handling
for COD Add \$3.00
Shipments by UPS Blue Label

MARYMAC INDUSTRIES INC.

800-231-3680

Radio Shack TRS-80's EPSON PRINTERS

People you Trust to give you the very best!



- Lowest Discount Prices
- Reliable Service
- Quality Products

**"World's largest Independent
authorized Tandy Dealer"**

22511 Katy Fwy., Katy (Houston) Texas 77450
(713) 392-0747 Telex 774132

ADD THE PICDISC TO YOUR PORTABLE* AND GET DESK TOP COMPUTER PERFORMANCE

SOFTWARE FEATURES:

- Filer — A menu driven LOAD/STORE program for transferring individual files (or total memory) to disc
- The industry standard CP/M 2.2™ operating system, which provides for access to all popular CP/M based software (including dBASE II™, Supercalc™, and T/Maker™).
- Modem — Public domain communications package (both terminal and disc file transfer modes)
- Utilities — DISKCOPY, COPY, FORMAT, and CP/M

Complete System described above — Only \$599*

SAVE ON POWERFUL INTEGRATED SOFTWARE — when purchased with PICDISC:

T/Maker — an integrated software package that provides:

- Word Processing
- Spreadsheet
- Spelling Checker with a 50,000 word Dictionary
- Relational Database Manager

Complete System above with T/Maker for \$799*

*Does not include Computer; M.C., Visa or check, plus \$5 shipping and 6% sales tax CA residents only.

*Immediately available for the TRS-80 Model 100 (portable must have 32K bytes RAM) and the NEC8201 and OLIVETTI OM-10 pending FCC approval.

Call or write: **PERSONAL INTEGRATED COMPUTERS (PIC)**

18013 SkyPark Circle, Ste. D., Irvine, CA 92714 (714) 261-0503

CP/M, dBASE II, SuperCalc, & T/Maker are trademarks of Digital Research, Ashton-Tate, Sorcim, & T/Maker respectively.

HARDWARE FEATURES:

- Lightweight (4.5 lb.) battery powered 3.5 inch micro-floppy system.
- 360K bytes/diskette (same as on the IBM PC).
- Approximately 20 hours on a single battery charge assuming normal disk access.
- 32K bytes additional RAM in the PICDISC — converting your portable to a 64K byte CP/M 2.2 micro-computer.
- Includes all cables, mounting hardware and battery charger.



```

910 OO=1:ST=0:EN=6.28:GOSUB 160 :GOTO 800
920 IF FF<>0 THEN 900 ELSE GOSUB 80
930 GOSUB 20
940 IF KE AND 128 THEN 180
950 OO=0:GOSUB 80
960 X0=R:Y0=L:R=GOSUB 100 :LR=Y0:R=X0:IF R<=0 THEN R=1
970 OO=1:GOSUB 80 :GOTO 930
980 IF FF<>9 THEN 1100 ELSE 1050
990 GOSUB 20
1000 IF KE AND 128 THEN 180
1010 IF LC=0 THEN ST=0:EN=6.28
1020 IF LC>0 THEN ST=3.14:EN=6.28
1030 IF LC<0 THEN ST=0:EN=3.14
1040 OO=0:GOSUB 160 :X0=CR:Y0=LC:GOSUB 100 :LC=Y0:CR=X0
1050 IF LC=0 THEN ST=0:EN=6.28
1060 IF LC>0 THEN ST=3.14:EN=6.28
1070 IF LC<0 THEN ST=0:EN=3.14
1080 IF CR<1 THEN CR=1
1090 OO=1:GOSUB 160 :GOTO 990
1100 IF FF<>10 THEN 1150 ELSE GOSUB 90
1110 GOSUB 20
1120 IF KE AND 128 THEN 180
1130 OO=0:GOSUB 90 :X0=R:Y0=L:GOSUB 100 :LR=Y0:R=X0:IF R<=0 TH
EN R=1
1140 OO=1:GOSUB 90 :GOTO 1110
1150 IF FF<>11 THEN 1200 ELSE OO=1:ST=0:EN=6.28:GOSUB 150
1160 GOSUB 20
1170 IF KE AND 128 THEN 180
1180 OO=0:ST=0:EN=6.28:GOSUB 150 :X0=LC:Y0=CR:GOSUB 100 :LC=X0:CR
=Y0:IF CR<1 THEN CR=1
1190 OO=1:ST=0:EN=6.28:GOSUB 150 :GOTO 1160
1200 IF FF<>13 THEN 1320 ELSE 1270
1210 GOSUB 20
1220 IF KE AND 128 THEN 180
1230 IF LC=0 THEN ST=0:EN=6.28
1240 IF LC>0 THEN ST=4.71:EN=1.57
1250 IF LC<0 THEN ST=1.57:EN=4.71
1260 OO=0:GOSUB 150 :X0=LC:Y0=CR:GOSUB 100 :CR=Y0:LC=X0
1270 IF LC=0 THEN ST=0:EN=6.28
1280 IF LC>0 THEN ST=4.71:EN=1.57
1290 IF LC<0 THEN ST=1.57:EN=4.71
1300 IF CR<1 THEN CR=1
1310 OO=1:GOSUB 150 :GOTO 1210
1320 IF FF=12 THEN RL$="R":GOTO 1340 ELSE IF FF=14 THEN RL$="L":
GOTO 1340
1330 IF FF<>12 OR FF<>14 THEN 1390
1340 GOSUB 60
1350 GOSUB 20
1360 IF KE AND 128 THEN 180
1370 OO=0:GOSUB 60 :X0=L:Y0=R:GOSUB 100 :LR=X0:R=Y0:IF R<1 THE
N R=1
1380 OO=1:GOSUB 60 :GOTO 1350
1390 IF FF<>19 THEN 1430 ELSE IF Y1>9 AND X1<540 AND Y1<210 THEN
XB=120:YB=60:PUT(X1,Y1-7),SC,XOR:OO=1:GOSUB 70 ELSE 180
1400 GOSUB 20
1410 IF KE AND 128 AND XB*YB<=7600 AND X1+XB<567 AND Y1+YB<219 THE
N PUT(X1,Y1-7),SC,XOR:OO=0:GOSUB 70 :GET(X1,Y1)-(X1+XB,Y1+YB),GB
:GOTO 100
1420 OO=0:GOSUB 70 :X0=XB:Y0=YB:GOSUB 100 :XB=X0:YB=Y0:OO=1:GDS

```

```

UB 70 :GOTO 1400
1430 IF FF<>20 THEN 1450 ELSE GOSUB 1930 :IF CP=1 THEN 1440 ELSE
PUT(X1,Y1),GB,PSET
1440 GOTO 180
1450 IF FF<>21 THEN 1470 ELSE GOSUB 1930 :IF CP=1 THEN 1460 ELSE
PUT(X1,Y1),GB,PSET
1460 GOTO 180
1470 IF FF<>22 THEN 1490 ELSE GOSUB 1930 :IF CP=1 THEN 1480 ELSE
PUT(X1,Y1),GB,AND
1480 GOTO 180
1490 IF FF<>23 THEN 1510 ELSE GOSUB 1930 :IF CP=1 THEN 1500 ELSE
PUT(X1,Y1),GB,OR
1500 GOTO 180
1510 IF FF<>24 THEN 1530 ELSE GOSUB 1930 :IF CP=1 THEN 1520 ELSE
PUT(X1,Y1),GB,XOR
1520 GOTO 180
1530 IF FF<>27 THEN 1620 ELSE POKE 120,135:GOSUB 1970 :CLS:SCREEN
1:PRINT "CONFIGURATION":PRINT TAB(5);"1" CURSOR:PRINT:PRIN
T TAB(5);"2" 'GPRINT':PRINT:PRINT TAB(5);"3" 'GPRINT':PRINT
1540 PRINT TAB(5);"4" 'GPRINT':PRINT:PRINT TAB(5);"5" RETURN:PRIN
T
1550 INPUT "TYPE 1-5 ";MC:IF MC<1 OR MC>5 THEN 1550
1560 CLS:ON MC GOTO 1570,1580,1590,1600,1610
1570 INPUT "TYPE 1-20 ";CA:IF CA<1 OR CA>20 THEN 1570 ELSE 1610
1580 PR$="GPRINT":GOTO 1610
1590 PR$="GPRINT2":GOTO 1610
1600 PR$="GPRINT3":GOTO 1610
1610 POKE 120,134:SCREEN 0:GOTO 180
1620 IF FF<>26 THEN 1770 ELSE POKE 120,135:GOSUB 1970 :GD=0
1630 IF X1<=6 OR X1>=567 OR Y1>=214 OR Y1<=16 THEN KE$=CHR$(13):GO
TO 1710
1640 KE$=INKEY$:IF KE$="" THEN 1640
1650 IF KE$=CHR$(8) OR KE$=CHR$(9) OR KE$=CHR$(10) OR KE$=CHR$(11)
THEN VIEW(1,181)-(29,194):CLR
1660 VIEW(0,0)-(639,239):IF KE$=CHR$(0) THEN GD=2:X1=X1+8:PUT(12,1
85),CW,PSET
1670 IF KE$=CHR$(9) THEN GD=0:X1=X1-8:PUT(12,185),CW,PSET
1680 IF KE$=CHR$(10) THEN GD=1:Y1=Y1-8:PUT(15,185),CW,PSET
1690 IF KE$=CHR$(11) OR KE$=CHR$(91) THEN GD=3:Y1=Y1+8:PUT(15,185)
,CW,PSET
1700 VIEW(61,1)-(639,219)
1710 IF KE$=CHR$(13) THEN POKE 120,134:VIEW(0,0)-(639,239):PUT(1,1
88),CW,PSET:GOTO 180
1720 IF GD=2 THEN X1=X1-8:IF X1<=6 THEN KE$=CHR$(13):GOTO 1710
1730 IF GD=0 THEN X1=X1+8:IF X1>=567 THEN KE$=CHR$(13):GOTO 1710
1740 IF GD=1 THEN Y1=Y1+8:IF Y1>=214 THEN KE$=CHR$(13):GOTO 1710
1750 IF GD=3 THEN Y1=Y1-8:IF Y1<=16 THEN KE$=CHR$(13):GOTO 1710
1760 GLOCATE(X1,Y1),GD:PRINT#3,KE$:GOTO 1640
1770 IF FF<>28 THEN 1790 ELSE POKE 120,135:GOSUB 1970 :PUT(X1,Y1)
,CW,XOR:VIEW(0,0)-(639,239):CLS:SCREEN 1:INPUT "READY PRINTER & PR
ESS 'ENTER'":ZZ$:GOSUB 1990 :IF PEEK(120)=135 THEN SYSTEM PR$ ELSE
CWO"1",PR$
1780 RC=1:GOSUB 2340 :RC=0:SCREEN 0:POKE 120,134:GOTO 180
1790 IF FF<>29 THEN 1810 ELSE POKE 120,135:GOSUB 1970 :VIEW(0,0)-
(639,239):CLS:SCREEN 1:INPUT "ENTER FILENAME ";FI$:GOSUB 1990 :FI$
="GSAVE "+FI$:IF PEEK(120)=135 THEN SYSTEM FI$ ELSE CWO"1",FI$
1800 RC=1:GOSUB 2340 :RC=0:SCREEN 0:POKE 120,134:GOTO 180
1810 IF FF<>30 THEN 1830 ELSE IF PEEK(120)<>134 THEN 180
1820 PUT(X1,Y1),CW,XOR:VIEW(0,0)-(639,239):CLS:POKE 120,135:GOSUB

```

Listing 1 continued

CONVERT YOUR TRS-80 MODEL III OR 4 INTO A DEVELOPMENT SYSTEM

Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system.

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. **THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs:** one TTL circuit for clock and reset, a Z-80, an EPROM and one peripheral interface chip.



When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/ assembler's debug and trace programs to check out both the *hardware and the software*. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the DEVELOPMATE's PROM PROGRAMMER to copy the program into a PROM. With this PROM and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact. Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3 1/2" x 5 1/4". A line plug mounted power supply is included. The PROM programmer has a personality module, which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758 2508(8K), 2716 2516(16K), 2532(32K), as well as the new electrically alterable 2816 and 48016(16K) EEPROMS.

The COMPLETE DEVELOPMATE 83 with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module, is **ONLY \$329!**

PM2 PERSONALITY MODULE for 2732A EPROM \$15
PM3 PERSONALITY MODULE for 2764 EPROM \$15

ORION INSTRUMENTS
702 Marshall Street #614
Redwood City, CA 94064
415-361-8883

MasterCard and Visa phone orders accepted.
California residents please add sales tax.

Circle 544 on Reader Service card

REAL QUALITY AT LOWER PRICES

VERBATIM DATALIFE 5 1/4" DISKETTES—LIFETIME GUARANTEE
FREE Color Coder Library Case with every box of 10

DS1801 (10) SSDD Write protect & Hub Ring \$17.95
DS2801 (10) DSDD Write Protect & Hub Ring \$19.95

INTRODUCING THE SRW COLOR CODER:

Complete diskette filing system by color (holds 10 ea.)

CC5CB (5) COLORBURST
(Grey, Red, Yellow, Green, Blue) \$16.95
CC5CL (5) CLASSIC (Black, Beige, Red, Blue, Grey) \$16.95

FLIP-N-FILE... THE ORIGINAL

YV3FLIP Holds 25 3.5 Micros \$12.95
YV5FLIP Holds 50 5 1/4" Diskettes \$19.95
YV8FLIP Holds 50 8" Diskettes \$34.95

CONTINUOUS FEED LABELS—1, 2, 3, or 4 across

1000... \$4.95 5000... \$14.95 10,000... \$24.95
20,000... \$46.95 All labels are 3 1/2" x 1 1/8" (other sizes in catalog)

DATASHIELD SURGE PROTECTORS

SP75 4 Sockets, on/off switch \$49.95
SP85 6 Sockets, Super Filters, on/off switch \$69.95
SP100 6 Sockets, Super Filters, Low Voltage Alarm \$75.95

COMPUTER PAPER—"Clean Edge" 9 1/2" x 11"

(Trims to 8 1/2" x 11")
CP120PP 20 lb. White 250 sheets \$9.95
CP120MP 20 lb. White 1000 sheets \$24.95
CP120DP 20 lb. White 2500 sheets \$39.95

WE CARRY A COMPLETE LINE OF RIBBONS, BACKUP POWER SUPPLIES, COMPUTER FURNITURE, AND OTHER ACCESSORIES

TLC COMPUTER PERIPHERALS

3161 STONE CREEK LANE
GRAPEVINE, TX 76051
(214) 450-4874

\$10.00 Minimum order
Texas Residents Add 5.25% sales tax
Shipping add 7% plus \$1.75 insurance
Call or write for Free Catalog

MiCom

DRIVES ✓

Teac FD55B Bare
DSDD 40 TRK 115.00
Teac FD55F Bare
DSDD 80 TRK 135.00
Teac FD55G
DSDD 1.2 meg 139.00
Teac FD55GF
DSDD 1.2 or 80 TRK 139.00
Drives w/case &
Power Supply add 45.00
Dual Case add 50.00
IBM 10 meg Hard Disk &
Controller 499.00

PRINTERS ✓

Star SG 10 239.00
Star SG 15 425.00
Epson LX 80 239.00
Epson FX 85 385.00
Epson FX 185 525.00
Epson RX 100 399.00
Printer Cable 21.00

MODEMS ✓

Hayes 300 Baud 175.00
Hayes 1200 Baud 375.00
Anchor Mark X 119.00
Anchor Mark XII 249.00
Express 1200 339.00
Maxwell 1200
IBM Card Modem 349.00
RS232 Cable 14.00

PERIPHERALS ✓

64K Chips 1.25 ea.
256K Chips 4.50 ea.
128K Piggy Back Chips 5.00 ea.
(All Compatible)
IBM Color Card 145.00
Bulk Diskettes
10 Pack of Diskettes 8.00
(Free Shipping in the U.S.A.)

CALL OR WRITE:

*PRICES SUBJECT TO CHANGE

P.O. BOX 397 • FARMINGTON HILLS, MI 48024 • (313) 483-2080

(Free Shipping in the U.S.A.)

```

1970 : SCREEN 1:SYSTEM "OIR /SR":PRINT:PRINT:INPUT "ENTER FILENAME
      ":F1$=F1$:"GLOAD "F1$:SYSTEM F1$:RC=1:GOSUB 2340 :RC=0:SCREEN 0:
POKE 120,134:GOTO 180
1980 IF FF<31 THEN 1040 ELSE VIEW(0,0)-(639,239):POKE 120,135:SC
REEN 1:CLS:IF PEEK(120)=135 THEN SYSTEM ELSE CMD"S"
1990 IF FF<32 THEN 100 ELSE VIEW(70,1)-(630,219):CLR:VIEW(0,0)-(-
639,239):GOTO 100
1995 TS(2)=CHRS(255):TS(3)=CHRS(65)+CHRS(34)+CHRS(20)+CHRS(8)+CHRS
(20)+CHRS(34)+CHRS(65)+CHRS(0):TS(4)=CHRS(255)+CHRS(255)+CHRS(0)+C
HRS(0):TS(5)=CHRS(3)+CHRS(12)+CHRS(40)+CHRS(192):TS(16)=CHRS(48)+CH
RS(12)+CHRS(3)+TS(7)=CHRS(204)
1996 TS(8)=CHRS(153)+CHRS(102):TS(9)=CHRS(240):TS(10)=CHRS(146)+CH
RS(146)+CHRS(255):TS(11)=CHRS(05)+CHRS(170):TS(12)=CHRS(255)+CHRS(
255)+CHRS(219)+CHRS(219):TS(13)=CHRS(192)+CHRS(48)+CHRS(12)+CHRS(3
):TS(14)=CHRS(129)+CHRS(0)+CHRS(0)
1997 TS(15)=CHRS(60)+CHRS(60)+CHRS(255)+CHRS(255):TS(16)=CHRS(255)
+CHRS(0):TS(17)=CHRS(255)+CHRS(32)+CHRS(32)+CHRS(32):CHRS(32):RETU
RN
1998 IF X1>=567 THEN X1=567
1999 IF X1<=0 THEN X1=1
1990 IF Y1<=1 THEN Y1=1
1990 IF Y1>=215 THEN Y1=215
1990 RETURN
1990 CF=0
1990 IF X1+XB>567 THEN CF=1
1990 IF Y1+YB>219 THEN CF=1
1990 RETURN
1990 FOR K=1 TO 100:ZZ$=INKEY$:NEXT:RETURN
1990 IF TS$="D" THEN Y1=X1+8:GLOCATE(X1,Y1),1
1990 VIEW(0,0)-(-68,239):CLR:VIEW(68,221)-(-639,239):CLR:VIEW(0,0)-(-
639,239):RETURN
2000 IF PF=1 THEN 2030
2010 FOR K=2 TO 17:IF PF=K THEN PAINT(X1,Y1),TS(K),1
2020 NEXT
2030 RETURN
2040 IF PF=1 THEN GLOCATE(80,229),0:PRINT#3,"EXIT" ELSE IF PF=2 T
HEN PUT(70,225),T2,PSET:PUT(94,225),T2,PSET ELSE IF PF=3 THEN PUT(
70,225),T3,PSET:PUT(94,225),T3,PSET
2050 IF PF=4 THEN PUT(70,225),T4,PSET:PUT(94,225),T4,PSET ELSE IF
PF=5 THEN PUT(70,225),T5,PSET:PUT(94,225),T5,PSET ELSE IF PF=6 THE
N PUT(70,225),T6,PSET:PUT(94,225),T6,PSET
2060 IF PF=7 THEN PUT(70,225),T7,PSET:PUT(94,225),T7,PSET ELSE IF
PF=8 THEN PUT(70,225),T8,PSET:PUT(94,225),T8,PSET ELSE IF PF=9 THE
N PUT(70,225),T9,PSET:PUT(94,225),T9,PSET
2070 IF PF=10 THEN PUT(70,225),T0,PSET:PUT(94,225),T0,PSET ELSE IF
PF=11 THEN PUT(70,225),T1,PSET:PUT(94,225),T1,PSET ELSE IF PF=12
THEN PUT(70,225),T2,PSET:PUT(94,225),T2,PSET
2080 IF PF=13 THEN PUT(70,225),T3,PSET:PUT(94,225),T3,PSET ELSE IF
PF=14 THEN PUT(70,225),T4,PSET:PUT(94,225),T4,PSET ELSE IF PF=15
THEN PUT(70,225),T5,PSET:PUT(94,225),T5,PSET
2090 IF PF=16 THEN PUT(70,225),T6,PSET:PUT(94,225),T6,PSET ELSE IF
PF=17 THEN PUT(70,225),T7,PSET:PUT(94,225),T7,PSET
2100 RETURN
2110 DIM T2(15),T3(15),T4(15),T5(15),T6(15),T7(15),T8(15),T9(15),T
0(15),T1(15),T2(15),T3(15),T4(15),T5(15),T6(15),T7(15),T8(15),T9
(15),T0(15):FOR X0=135 TO 615 STEP 30:K=X0+1:IF K=1 THEN GLOCATE(136,2
29):PRINT#3,"EX":GOTO 2130 ELSE PAINT(X0,230),TS(K),1
2130 NEXT:IF RC=1 THEN RETURN
2140 GET(160,225)-(105,239),T2:GET(190,225)-(215,239),T3:GET(220,2

```

TRS 80 Computers

All Tandy Computer Products Available
Manufacturer's Warranty

Model 1000 Model 4
Model 1200 HD Model 100/200
Model 2000 26-5111 Monitor

New Tandy Printers Available

Lowest Prices Available Anywhere

Visa — MasterCard — American Express
Cashier's Check — Money Order

Business Telephone Systems — Discount Prices —
Install your own. Completely modular.
Call for Prices

Computer Specialist available for assistance.

TALLEY COMMUNICATIONS CO.

P.O. Box 193 • 121 N. State St.

Decatur, Texas 76234 • 817-627-5585 • 817-627-1017

Call for other computer, telephone and accessory prices!

Fast Delivery

References Available

INTRODUCING



A NEW VERSION OF LAZY WRITER

The NEW Lazy Writer is packed with features, but a word processor is more than a collection of features. Like a friend, its personality must please you. Lazy Writer has been an excellent product since its introduction in 1980, and thousands of users have told us its design fits the way they write.

Lazy Writer is an in-memory system, meaning you load your text (up to 36,000 characters) into memory and it stays there until you're finished. There are no disk drives grinding away as you edit, constantly repaging and slowing you down. Does in-memory mean you can only have as much text as fits in memory? No! You can create multiple files and "chain" them together for printing as one. You can even preview page breaks or see what's going to be on a selected page.

We designed our word processor for one-key editing. Your fingers don't have to reach for two or three keys at once, nor do you need to remember which two or three keys are needed for a function like delete. All you have to remember is to press "d" for delete. All editing keys are this easy to remember ("i" for insert, "b" for block move, "f" to find, etc.). It's this easy because you enter your text in the Text Entry mode, then switch to Edit mode to make corrections. There is no need to create or "open" a file before beginning a new document. Just type, then edit.

Typing and editing are only two aspects of word processing. Printing out the text is the other part. Five years ago, Lazy Writer made history by being the first TRS-80 word processor to support embedded printer codes (any codes, anywhere in text, any number of times). With version 3.5, it's even easier to get bold face, small type, superscripts, and many other functions. The NEW Lazy Writer expanded PRINTER CUSTOMIZATION makes these tasks easy enough for anyone to use. Printing in elite type is as easy as the command ">elite".

But you can still send any code from text and you can easily change the codes for "elite" (or any other special printer feature) to fit your next printer. Lazy Writer doesn't become obsolete. If you bought it in 1980, you can still print text created then on a Model I with the 80 character Model 4 version today.

People who would rather get on with their writing than spend hours memorizing commands or waiting for disk drives will like Lazy Writer. If that sounds like you, why not call us right now? Try Lazy Writer for 15 days and if you don't find it an easy-going friend, send it back for a refund.

★ ASK ABOUT A SPECIAL VERSION FOR THE HOT NEW MULTIDOS 80/64.

★ WORKS WITH ANY PRINTER, SERIAL OR PARALLEL

★ MODEL 4 VERSION HAS 80 X 24 CHARACTER SCREEN

★ COMES ON A MINI DOS OR A WELCOME PROGRAM TRANSFERS THE FILES TO THE DOS OF YOUR CHOICE

Model I, III, or 4atill only \$124.95

MULTIDOS 80/64 - FOR THE MODEL 4/4P

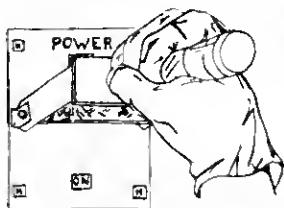
Send for information on this unique DOS for your Model 4. This is a totally redesigned system that gives you a choice of 64 or 80 characters, use of the second 64K memory, better BASIC with 41K free space, and more. For Model 4P owners, run Model III software and never load MODEL4/III file again! MULTIDOS 80/64 runs software written for the Model III...does not run TRSDOS 6 software.

MULTIDOS 80/64 now with 32K print spooler utility \$99.95

AlphaBit Communications, Inc.
13349 Michigan Ave.
Dearborn, Michigan 48128
(313) 581-2896

Send for information on
our other TRS-80 programs

MasterCard/Visa Accepted



Model 4 owners:

SWITCH ON HIGH POWER

If you use a Model 3 DOS, **SUPERMOD4** energizes your TRS-80 with powers far greater than those of ordinary computers.

its dozens of powerful features include 80x24 video, keyclick, print spooler, fast CPU speed (w/correct RTC) and much much more. **SUPERMOD4** operates on almost any Model 3 DOS and touches absolutely no user memory (an ITC exclusive).

The critics are raving!

"You can choose from a number of programs that give you the Model 4's extra power in the Model 3 mode. **SUPERMOD4** is the best one I've seen."

—David Dutton, 80 Micro 9-85

"Does it work? You bet it does!" —Lon Andrews, Computer Shopper 4-85

"Supermod4 has become almost as essential as my DOS."

—David Dutton, 80 Micro 9-85

Users around the world agree. **SUPERMOD4** is the most valuable software system you've ever own.

Send for details or

SEE REVIEW IN THIS ISSUE

then order today for only **\$49.95**

Model 4P owners: please inquire

Lightning Strikes Twice!

Now your disk drives can experience Superpower
—with **SUPERDISK**.

SUPERDISK is a software Ramdisk exclusively for NEWDOS/80 2.x users. It is the best, most powerful, versatile and easy to use Ramdisk available. And it is the only Ramdisk capable of addressing up to one megabyte of RAM!

Send for details or order today for only **\$49.95**



Intellitech Corporation

(formerly Intelligent Technologies Co.)

Finding the software answer to the hardware problem

21 Campbell Drive • Dix Hills, New York 11746 • (516) 462-6970

Terms: checks, money orders or C.O.D. • Free shipping in cont. U.S. (C.O.D. extra) • N.Y.S. resale and sales tax • foreign: add. postage

Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page
82 Aerocomp	98, 99	9 H & E Computronics	CIV, 28	176 Personal Computer Products	115
215 Alcor Systems	39	9 H & E Computronics	85	440 Personal Integrated Computers	107
135 Allen Gelder Software	81	455 Hard Drive Specialist	121	290 Pickles & Trout	62, 77
30 Allwrite	10	355 H.D.P.	115	366 PICO	117
476 AlphaBit Communications, Inc.	111	175 Howe Software	59	406 Powersoft	95
17 Alpha Products	13, 15	46 Hypersoft	124	508 Powersoft	44, 45
99 Alpha Technology Inc.	81	401 Intelitech Corp. (ITC)	111	249 Press A Software	70
374 ALPS	27	101 J & M Systems, Ltd.	CIR	76 Producer, The	24
303 Alternate Choice (The)	103	126 JMG Software International	2, 3	449 Professor Jones/Frogg House	120
141 Anitek Software Products	23	126 JMG Software International	63	30 Prosoft	11
383 Astro-Star Enterprises	70	534 Jameco Electronics	53	490 Public Domain Software	96
275 AutoCad	35	* James River Group	97	* Software Support	74, 75
152 BCCOMPCO	123	485 Kaiglo Electronics	119	427 SOTA Computing Systems Ltd.	40
186 Blue Ridge Software	95	292 Kamasoft, Inc.	89	71 Sublogic Communications	88
86 Computologic Corp.	126	422 Kelly Enterprises	103	150 Summit Software Technology Inc.	115
133 Computer Discount of America	119	* Langley-St. Clair	27	285 Sun Research, Inc.	91
357 Computer Friends	41, 77	159 Logical Systems	71	456 Sunlock Systems	51
18 Computer Plus	86	493 Marathon Software	119	498 Systems Support	72
45 Comucopia Software	1	250 Marymac Industries Inc.	107	266 T/Maker	51
239 D & A Research	103	363 MICOM	109	544 TLC Computer Peripherals	109
539 Desert Sound Inc.	72	336 Micro Data Products	103	189 Tab Sales	97
282 DFW Computer Center	46, 47	464 Micro Labs Inc.	127	347 Talley Communications	111
204 DiskCount Data	7	488 Micro-Link	107	91 Total Access	54
62 Displayed Video	97	137 Miller Microcomputer Services	89	198 Traveling Software	125
91 Downtimer	9	107 Misceys, Inc.	55	227 Trisoft	122
218 E.A.P. Co.	96	411 Montezuma Micro	18, 19	155 Ultimate Software	115
85 Educational Micro Systems	32	418 Montezuma Micro	84, 85	279 Zygotron	117
80 Micro		424 Montezuma Micro	50		
CW Communications Inc.	113	* NRI Schools	117		
Classified	126	281 Nibble Notch	120		
549 Classified Ads	128	232 Nocona Electronics	28		
Load 80 Subscription	64	151 Orion Instruments	109		
45 Electric Webster	1	242 Osicom Inc.	61		
350 EnFleur Corp.	80	207 Pacific Exchanges	103, 117		
392 Evolving Technology Co.	4	268 Palantir Software	CIR		
49 Field Magnetics Inc.	124	414 P.B.J. Inc.	125		
214 Ft. Worth Computers	42, 43	470 P.G. Design	96		
295 G.T. Enterprises	97	124 Perry Computers	20		

For further information from our advertisers, please use the Reader Service card.
*This advertiser prefers to be contacted directly.

Advertising Sales (603) 924-7138
or (800) 441-4403
West Coast Sales (415) 328-3470

Tidbit #27

Here is a Model 4 Basic sort routine (lines 1100-1540) that I find useful for printing out information from large data bases. The remark statements contain the data statements' source code.

Lines 10-70 demonstrates how to use the sort routine; "file name" represents an existing disk file.

First, GOSUB the sort routine to install the machine-language sort. Dimension an array with one more element than the number of records you want to sort and define the last element as "...". Load the array with character strings long enough for a satisfactory sort (e.g., 10 characters for a last name), and concatenate the string with MKI\$(R), where "R" is the record number from which you get the data.

To invoke the sort, use the command CALL SORT(A\$(S)), where A\$ is the array you want sorted and S is the location within the array where the sort begins. When the sort is done, use CVI to get the records in sorted order from the disk file.

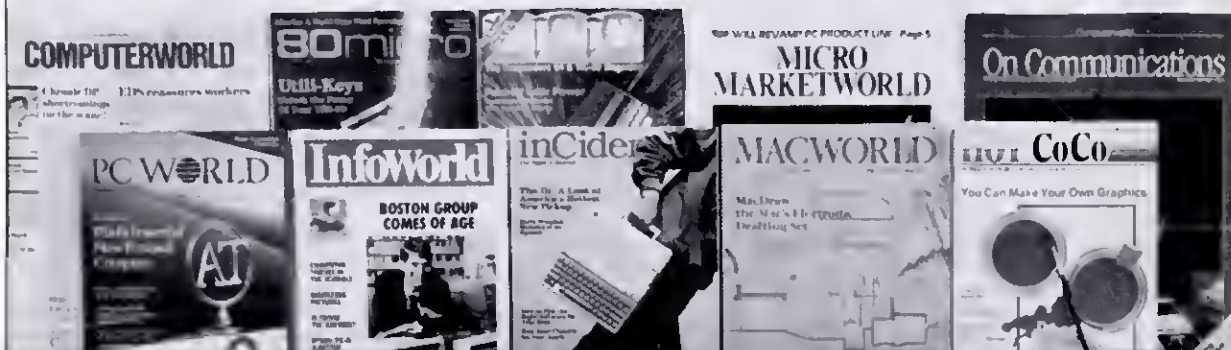
Edward F. De Mers
El Cajon, CA

```

10 GOSUB 1110
20 DIM A$(16) : A$(16)=""
30 OPEN "R",1,"filename":FIELD L, 15 AS X$, 10 AS Y$
40 FOR R=1 TO 15: GET 1, R:AS(I)=LEFT$(X$,10)+MKI$(R): NEXT R
50 CALL SORT(A$(1)) :REM call sort routine
60 FOR K=1 TO 15:G=CVI(RIGHT$(A$(K),2)):GET 1,G:PRINT X$, Y$:NEXT K
70 CLOSE: END
1110 SZ=82:D$=STR$(SZ,0):DIM E(SZ):F=VARPTR(D$)
1120 FOR X=0 TO SZ-1:READ E(X):NEXT X
1130 LS=256*PEEK(X+2)+PEEK(X+1):IF LS>32767 THEN LS=LS-65536:SORT=LS
1140 FOR X=0 TO SZ-1:POKE LS+X,E(X):NEXT X:RETURN
1150 DATA 4HE5 :REM BEGIN PUSH HL Pointer Array
1160 DATA 4HFD,4HE1 :REM POP 1Y Stored here
1170 DATA 4HFD,4HE5 :REM AGIN PUSH 1Y Recover Stack
1180 DATA 4HDD,4HE1 :REM POP 1K Working pointer
1190 DATA 4H8E,0 :REM LD C,0 Clear Exch Flag
1200 DATA 4HDD,4H7E,3 :REM NEXT LD A,(IX+3) Element Length
1210 DATA 4H87 :REM OR A Set Flag
1220 DATA 4H2B,4H3E :REM JR Z,LSTLN Last Element
1230 DATA 4H06,2 :REM SUB 2 Cut off 2 bytes
1240 DATA 4H47 :REM LD B,A Set elem.length
1250 DATA 4HDD,4H6E,1 :REM LD L,(IX+1)Addr 1st string
1260 DATA 4HDD,4H6E,2 :REM LD H,(IX+2)
1270 DATA 4HDD,4H5E,4 :REM LD E,(IX+4)Addr nxt string
1280 DATA 4HDD,4H5E,5 :REM LD D,(IX+5)
1290 DATA 4H1A :REM LOOP LD A,(DE) Byte to reg A
1300 DATA 4H8E :REM CP (HL) Comp. set flags
1310 DATA 4H2B,4 :REM JR Z,EQUAL Jump on equal
1320 DATA 4H3B,6 :REM JR NC,NOSWPAIready order
1330 DATA 4H3B,12 :REM JR C,SWAP Exchange elem.
1340 DATA 4H23 :REM INC HL Point next byte
1350 DATA 4H13 :REM INC DE in strings
1360 DATA 4H1B,4HF4 :REM DJNZ LOOP Comp next byte
1370 DATA 4HDD,4H23 :REM INC 1X Add three to
1380 DATA 4HDD,4H23 :REM INC 1X pointer
1390 DATA 4H1B,4HDD :REM INC 1X
1400 DATA 4H1E,4H07 :REM JR NEXT Do next pair
1410 DATA 4H4B :REM SWAP LD C,B Set exch flag
1420 DATA 4HDD,4H6E,2 :REM LD H,(IX+2)
1430 DATA 4HDD,4H6E,1 :REM LD L,(IX+1) Exchange
1440 DATA 4HDD,4H5E,5 :REM LD D,(IX+5) pointer
1450 DATA 4HDD,4H5E,4 :REM LD E,(IX+4) to the
1460 DATA 4HDD,4H7E,2 :REM LD (IX+2),D at string
1470 DATA 4HDD,4H7E,1 :REM LD (IX+1),E data
1480 DATA 4HDD,4H7E,5 :REM LD (IX+5),H
1490 DATA 4HDD,4H7E,4 :REM LD (IX+4),L
1500 DATA 4H1B,4HDD :REM JR NOSWPA Do next pair
1510 DATA 4H79 :REM INC LSTLN LD A,C Get exch flag
1520 DATA 4H87 :REM OR A Juggle flags
1530 DATA 4HCB :REM RET Z If # all done
1540 DATA 4H1B,4HB1 :REM JR AGIN Run thru array

```

There's only one newsstand in the entire world offering you this selection of great computer publications.



You're holding it.

That's right; you can get them all here. **And at discounts.** So browse. Whether you're new to computers, an experienced home/professional user or "in the business": order yours, today!

- ☐ **Computerworld.** If you manage information, you can't manage without your own subscription. \$39 gets you 51 issues, plus 10 Special Focus publications. Save \$5.
- ☐ **PC World.** The one publication that will grow with your growing PC needs. Helps you analyze financial/accounting data, manage complex projects, communicate results and plan. Now 12 issues for only \$17.97; you save \$5.78.
- ☐ **InfoWorld.** The only way to stay on top of what's happening is by getting the **only** personal computing newsweekly. Authoritative. Objective. Easy to read. \$29.58 for 51 issues . . . only 58¢ an issue.
- ☐ **inCider.** The Apple journal . . . and the **only** magazine devoted exclusively to the Apple family of computers. \$24.97 for 12 monthly issues. Save 30% off the cover price.
- ☐ **Macworld.** The world's most creative computer demands a journal that's just as simple, powerful and fun: *Macworld*. Now 12 issues of this attractive, easy-to-read publication can be yours for only \$24 (you save \$6).
- ☐ **HOT CoCo.** Keep the color in your life all year long with *HOT CoCo*, the magazine specifically created for the TRS-80 color computer and MC-10 user. \$24.97 for 12 months. Save 30% off the cover price.
- ☐ **80Micro.** Don't risk being an uninformed TRS-80 user. Get current, unbiased, system-specific information from the largest, most knowledgeable TRS-80 source. \$24.97 for 12. Save 48% off the cover price.
- ☐ **RUN.** The informative (and fun) Commodore 64/Vic-20 monthly. Comprehensive software/hardware reviews, action-packed games and timely tips to help you get the most out of your system. \$19.97 for one year: 43% off the cover price.
- ☐ **Micro Marketworld.** Selling? Twice a month, get in-depth reviews/forecasts to keep **ahead** of consumer trends/market needs. **FREE** if you qualify.

☐ **On Communications.** Bypass, teleconferencing, CATV: each month, explore the major developments shaping our communications world. **FREE** to qualified applicants.

TO ORDER:

Check the publications you want above, then fill in below, and return this page to:

CW Communications/Inc.
Circulation Department
Box 880
Framingham, MA 01701

Name _____
(Please print or type.)

Title _____

Company _____

Nature of Business _____

Street _____

City _____

State _____ Zip _____

Telephone (____) _____

Address shown is: ☐ Home ☐ Business

☐ Bill me.

☐ Payment enclosed (make check payable to "CW Communications/Inc.")

☐ Send information about foreign rates.

Please allow 6 to 8 weeks for your first issue.

Your Money-Back Guarantee

If for any reason you're ever dissatisfied with your subscription, simply request a refund for all unmailed issues.



CW COMMUNICATIONS/INC.

375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

6C09-12-EM09

```

2) :GET(0,40)-(4,45),CN:LINE(2,50)-(2,55):LINE(2,55)-(0,53):LINE(2,
55)-(4,53):GET(0,50)-(4,55),CS
2330 PUT(6,0),CN,OR:PUT(5,3),CE,OR:PUT(6,5),CS,OR:PUT(0,3),CW,OR:G
ET(0,0)-(15,10),DC:GOSUB 1900
2340 LINE(0,0)-(59,239),B:LINE(30,0)-(30,239):X1=1:X2=59:FOR Y=15
TO 230 STEP 15:LINE(X1,Y)-(X2,Y):NEXT:LINE(69,225)-(120,239),B:L
INE(129,225)-(639,239),B:Y1=225:Y2=239:FOR X=159 TO 639 STEP 30:L
INE(X,Y1)-(X,Y2):NEXT
2350 VIEW(0,106)-(59,134):CLR:VIEW(0,0)-(639,239):LINE(69,0)-(639,
220),B:IF RC=1 THEN GOSUB 2120 ELSE GOSUB 2110
2360 LINE(4,13)-(46,21):LINE(30,2)-(49,10),B:LINE(51,3)-(51,11):L1
NE(40,11)-(51,11):LINE(40,2)-(51,3):LINE(38,10)-(40,11):LINE(5,27)
-(16,16):LINE(27,27):LINE(5,27):LINE(34,10)-(40,27),B:LINE(30,2
0)-(53,23),B
2370 CIRCLE(16,37),11:CIRCLE(16,37),12,,,,,17:CIRCLE(16,37),6,,,,,2
:LINE(35,30)-(39,34):LINE(35,30)-(39,42):LINE(55,30)-(51,34):LINE(
55,30)-(51,42):LINE(39,34)-(51,34):LINE(39,42)-(51,42):X1=15:Y1=47
:OO=1:CR=6:LC=9:ST=0:EN=6:20:GOSUB 160
2380 X1=45:Y1=49:LR=7:R=6:OO=1:GOSUB 00 :X1=15:Y1=62:OO=1:CR=6:L
C=9:ST=3:14:EN=6:20:GOSUB 160 :X1=45:Y1=64:LR=7:R=6:OO=1:GOSUB 90
:X1=5:Y1=92:OO=1:CR=5:LC=15:ST=0:EN=6:20:GOSUB 150 :RLS="R":OO
=1:R=5:LR=10:X1=40:Y1=82:GOSUB 60
2390 X1=5:Y1=97:OO=1:CR=5:LC=15:ST=4:71:EN=1.57:GOSUB 150 :RLS="L"
:OO=1:R=5:LR=10:X1=40:Y1=97:GOSUB 60
2400 LINE(5,140)-(25,147):LINE(5,145)-(25,138):CIRCLE(5,139),3:CI
RCL(5,146),3:GLOCATE(41,141),0:PRINT#-3,"P":LINE(39,140)-(51,147),
B:LINE(46,137)-(46,140):LINE(43,139)-(49,139):LINE(44,130)-(47,13
8)
2410 GLOCATE(11,157),0:PRINT#-3,"I":LINE(9,155)-(21,162),B:LINE(1
6,152)-(16,155):LINE(13,150)-(18,154):LINE(14,153)-(17,153):LINE(9
,163)-(21,163),0:GLOCATE(41,155),0:PRINT#-3,"A":LINE(39,155)-(51,1
62),B:LINE(46,152)-(46,155)
2420 LINE(43,154)-(40,154):LINE(44,153)-(47,153):GLOCATE(11,170),0
:PRINT#-3,"O":LINE(9,170)-(21,177),B:LINE(16,167)-(16,170):LINE(1
3,169)-(19,169):LINE(14,169)-(17,169)
2430 GLOCATE(41,170),0:PRINT#-3,"X":LINE(39,170)-(51,177),B:LINE(
46,167)-(46,170):LINE(43,169)-(49,169):LINE(44,160)-(47,160):PUT(8
,182),DC,PSET
2440 GLOCATE(41,180),0:PRINT#-3,"A":GLOCATE(36,187),0:PRINT#-3,"B"
:GLOCATE(45,187),0:PRINT#-3,"C":LINE(31,180)-(59,180):GLOCATE(3,19
5),0:PRINT#-3,"CON":LINE(1,195)-(30,195):GLOCATE(3,202),0:PRINT#-3
,"ZIG"
2450 LINE(35,200)-(55,207),B:LINE(51,202)-(53,205),B:LINE(30,197
)-(47,203),B:PAINT(39,190),1,1:PAINT(46,202),1,1:GLOCATE(12,212),
B:PRINT#-3,"B":LINE(5,213)-(25,222),B:LINE(15,219)-(15,222),B:L1
NE(24,216)-(25,217),B
2460 LINE(42,212),0:PRINT#-3,"L":LINE(35,213)-(55,222),B:LINE(
45,219)-(45,222),B:LINE(35,212)-(55,212),0:LINE(54,216)-(55,217),
B:GLOCATE(12,227),0:PRINT#-3,"T":GLOCATE(12,231),0:PRINT#-3,"C":L
INE(2,239)-(9,232):LINE(2,225)-(9,232)
2470 LINE(29,224)-(22,231):LINE(29,239)-(22,232):CIRCLE(45,220),5,
,,,1:LINE(40,229)-(50,237),B:PAINT(45,230),CHRS(17),1:RETURN
2480 GET(1,1)-(29,14),OR:GET(31,1)-(59,14),LI:GET(30,2)-(51,11),E1
:GET(1,16)-(29,29),TR:GET(31,16)-(59,29),BO:GET(1,31)-(29,44),CI:G
ET(31,31)-(59,44),PO:GET(1,46)-(29,59),CI:GET(1,61)-(29,74),C2:GET
(31,46)-(59,59),YU:GET(31,61)-(59,74),YD
2490 GET(1,76)-(29,89),C3:GET(31,76)-(59,89),CR:GET(1,91)-(29,100),
C4:GET(31,91)-(59,104),CG:GET(1,136)-(29,149),SC:GET(31,135)-(59,
149),PP:GET(1,150)-(31,164),IN:GET(31,150)-(59,164),AN:GET(1,165)-
(31,179),RO:GET(31,165)-(59,179),XO

```

Listing 3 continued

```

2500 GET(1,100)-(31,194),CO:GET(31,100)-(59,194),AB:GET(1,195)-(29
,209),BP:GET(31,195)-(59,209),PR:GET(1,210)-(29,224),SO:GET(31,210
)-(59,224),LD:GET(1,225)-(29,238),TC:GET(31,225)-(59,238),GC:SCREE
N 0:RETURN
2510 IF PEEK(120)=135 OR PEEK(120)=134 THEN CLEAR,-3073:POKE 120,1
34:XP=6HF440:ELSE XP=14400
2520 GF=1:CLS:PRINT "INITIALIZING . . . please wait":GOTO 10

```

End

Program Listing 2. Screen grid generator.

```

10 'SCRNGRID/BAS
20 'A full line grid for screen incremented 10 pixels on x,y coord
inates for laying out screen graphics
30 CLR:SCREEN0:IC=10:X=0:Y=0
40 'Y axis lines
50 LINE(X,Y)-(640,Y)
60 Y=Y+1:IF Y=260 THEN 90
70 GOTO 50
80 'X axis lines
90 LINE(0,239)-(639,239):X=X+1:Y=0
100 LINE(X,Y)-(X,240)
110 X=X+10:IF X=660 THEN 130
120 GOTO 100
130 LINE(639,0)-(639,240)
140 IF INKEY$="" THEN 140

```

End

Program Listing 3. Hexagon design.

```

110 ' HEXTRI/BAS
130 CLR:CLS:SCREEN0
140 'OUTSIDE PERIMETER
150 LINE(140,110)-(220,40) 'AO
160 LINE(400,40) 'BO
170 LINE(400,120) 'CO
180 LINE(400,195) 'DO
190 LINE(220,195) 'EO
200 LINE(140,110) 'FO
210 'LINES TO HUB
220 LINE(220,40)-(310,120) 'H1 (C=CENTER-310,120)
230 LINE(400,120)-(310,120) 'N3
240 LINE(220,195)-(310,120) 'N6
250 'TURNS OUTSIDE PERIMETER INTO BARS
260 LINE(163,110)-(220,60) 'AM1
270 LINE(105,110)-(230,70) 'AI
280 LINE(260,55)-(390,55) 'BM1
290 LINE(270,65)-(365,65) 'B1
300 LINE(390,55)-(450,110) 'CM1
310 LINE(300,70)-(425,110) 'C1
320 LINE(445,130)-(380,105) 'DM1
330 LINE(420,130)-(380,165) 'D1
340 LINE(300,185)-(260,105) 'EM1
350 LINE(367,175)-(270,175) 'E1
360 LINE(220,175)-(163,110) 'FM1

```

LARGE CAPACITY ACCOUNTING PROGRAMS

★ NEED JUST 2 DRIVES FOR CAPACITY BELOW ★

ACCTS RECEIVABLE \$150.00
 5000+ ACCOUNTS 15000+ TRANSACTIONS
 BALANCE FORWARD 99 TRANSACTIONS SHOW
 30-60-90-120 AGED STATEMENTS SHOW
 DATE/INV# / DESCRIP / AMT / & AGEING
 SELECTIVE FINANCE CHARGES & RATES
 FAST ENTRY POSTING W/ AUDIT REPORT
 SUB - ACCTS % CREDIT LIMIT DATE OF
 LAST PAYMENT, LABELS
 ADD \$50.00 FOR INVOICING MODULE
 OTHER OPTIONS AVAILABLE - CALL

ACCTS PAYABLE \$50.00
 DERIVED FROM OUR A/R - WRITES CHECKS

GENERAL LEDGER \$150.00
 400+ ACCTS 5000+ TRANSACTIONS/MONTH
 - BEST LOOKING FINANCIAL STATEMENTS
 - DEPARTMENTAL P & L (UP TO 9)
 - STATEMENT OF CHANGES
 - SUB-TOTALS WHERE YOU WANT
 - FAST FLEXIBLE POSTING INPUT
 - PERCENTAGE P & L

DEMO AVAILABLE \$20.00 EACH
 APPLIES TOWARDS PURCHASE

COMBINATION SPECIALS
 # 1 A/R & G/L FOR \$200.00
 # 2 A/R, A/P & G/L FOR \$225.00
 HARD DISK VERSION SLIGHTLY MORE

NEW - Only \$39⁰⁰

ULTIMATE

★ ROOTS ★

Genealogy Program

- ★ Record all family data
- ★ Chronology Lists
- ★ Lists of Events
- ★ Source, Comments, Remarks
- ★ Much, much more

Other Programs Available:

Ultimate Mail: Super versatile Mail Management System. **Special — \$49.00**

Cardex: Prints fan-fold Rolodex cards. Sale price — **\$39.00**

Check—Visa—MasterCard—M.O.

ULTIMATE SOFTWARE

PO BOX 1291
 HAYDEN LAKE
 IDAHO 83835
208-772-7634

You're in Good Company When You Program in BetterBASIC



BetterBASIC features include: 640K, STRUCTURED, MODULAR, INTERACTIVE, EXTENSIBLE and COMPILED. Prices: BetterBASIC: \$199, 8087 Math Module: \$99, Runtime System: \$250, Sample Disk: \$10.

Summit Software Technology, Inc. 1-800-225-5800
 P.O. Box 99, Babson Park, Wellesley, MA 02157
 In Canada: 416-469-5244

MasterCard VISA P.O. Checks
 Money Orders and C.O.D. accepted
 BetterBASIC is a registered trademark of Summit Software Technology, Inc.
 IBM PC, and IBM PC XT are registered trademarks of International Business

Better BASIC

Machines Corp. Tandy is a registered trademark of Tandy Corp. Illustrated above are registered trademarks of the following companies: Apple Int'l Corp. AT&T General Electric Co. Westinghouse Electric Corp. TPA Inc.

ALSO AVAILABLE FOR THE TANDY 1000, 1200 AND 2000



5¢/hr.

FILE TRANSFER + Conversion Utilities

Transfers: (no more retyping)

- Visicalc, Multiplan
- Data Files, ASCII Files
- Word Processing Files
- Basic, Fortran, Cobol

MC/MS/CO/DC/CHK OK

TRANSFER SERVICE: Call for Information

Free with any order this Month Omegabug or Diskette Pens

TRS Apple CP/M	→	To IBM PC/XT Tandy 1000, 1200, 2000 IBM AT	149.95 149.95 224.95
----------------------	---	---	----------------------------

IBM PC (To/From) Tandy 2000 Disk Transporter 129.95



**PERSONAL
COMPUTER
PRODUCTS**

Drives 360 KB	265.00
CMI 40 Meg.	1150.00
128K Ram Set	145.00
Prototype Board & Extender Cards	120/ea.
High Capacity Disks	\$40/10

3080 Olcott Dr. Ste. 1308, Santa Clara, CA 95051 (408) 988-0164

```

370 LINE(235,165)-(195,120) 'F1
380 'INSIDE LINES THAT DO NOT GO TO HUB
390 LINE(163,110)-(297,110) 'P1 TOP
400 LINE(195,120)-(310,120) 'P1 MID
410 LINE(205,130)-(297,130) 'P1 BOT
420 LINE(220,60)-(270,110) 'P2L
430 LINE(365,65)-(310,120) 'H2
440 LINE(260,55)-(300,100) 'H1R
450 LINE(340,65)-(297,110) 'H2L
460 LINE(390,55)-(335,120) 'H2R
470 LINE(450,110)-(343,110) 'H3T
480 LINE(220,175)-(275,130) 'H5L
490 LINE(300,105)-(297,130) 'H4L
500 LINE(380,165)-(310,120) 'H4
510 LINE(335,120)-(390,155) 'H4R
520 LINE(445,130)-(349,130) 'H3BOT
530 LINE(314,139)-(260,185) 'H5R
540 'PRINT
550 PAINT(142,110),CHR$(#H03)+CHR$(#H05),1 'LEFT OUTSIDE
560 PAINT(230,42),CHR$(#H04),1 'RIGHT OUTSIDE
570 PAINT(390,193),CHR$(#H05),1 'RIGHT BOTTOM OUTSIDE
580 PAINT(310,122),CHR$(#H04),1 'BOTTOM INSIDE L
590 PAINT(313,110),CHR$(#H04),1 'TOP L
600 PAINT(307,110),CHR$(#H04),1 'LEFT L
610 PAINT(170,105),CHR$(#H04)+CHR$(#H08),1 'TOP SHORT
620 PAINT(397,70),CHR$(#H04)+CHR$(#H08),1 'RIGHT TOP SHORT
630 PAINT(270,100),CHR$(#H04)+CHR$(#H08),1 'BOTTOM SHORT
640 PAINT(209,127),CHR$(#H0F)+CHR$(#H08),1 'IS1
650 PAINT(300,160),CHR$(#H0F)+CHR$(#H08),1 'IS2
660 PAINT(345,70),CHR$(#H0F)+CHR$(#H08),1 'IS3
670 IFINKEY$="" THEN GOTO 670
680 SCREEN
690 CLS

```

End

Program Listing 4. Computer design.

```

5 'COMPUTER/BAS
10 CLR:SCREEN0
20 LINE(60,30)-(450,30)
30 LINE-(450,160)
40 LINE-(60,160)
50 LINE-(60,30)
60 ' OUTER PROFILE
62 CIRCLE(55,25),20,,1.57,3.14 'UPPERLSP CORNER
64 CIRCLE(590,25),20,,0,1.57
70 LINE(50,15)-(595,15) 'TOP LINE
80 LINE(610,25)-(610,180)
90 LINE-(635,220)
100 LINE-(635,230)
110 LINE-(10,230)
120 LINE-(10,220)
130 LINE-(35,180)
140 LINE-(35,25) 'LSP SIDE LINE
150 'DISK DRIVES (TOP)
160 LINE(460,40)-(590,40)
170 LINE-(590,05)

```

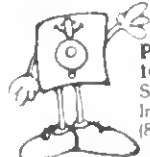
End

Maxell Floppy Disks

The Mini-Disks
with maximum quality.



Dealer inquiries
invited. C.O.D.'s
accepted Call
FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401
In Cal. call (800) 592-5935 or
(805) 543-1037

Pico?

If you've even
THOUGHT
about buying
a Model 100
or 200, check out *PICO*—The
Briefcase Computer Report,



Wayne Green's
newest publication:
PICO, WGE Center/
70 Rte. 202N, Peter-
borough, NH 03458.

World's smallest reply coupon—neatness counts

Name _____
Address _____
Notes _____

Circle 366 on Reader Service card.

PRINTER OWNERS

Letters are received here on a regular basis
from customers saying how much they really
enjoy receiving our lists.

It's probably safe to say that the price lists
issued here are different from most of the
others. Maybe it's the chatty folksy style of
writing? Perhaps it's the low, almost unbe-
lievable, prices on printer cartridges? Again,
it could be dealing with a dealer that under-
stands the hobby Computer user and really
cares about what you think?

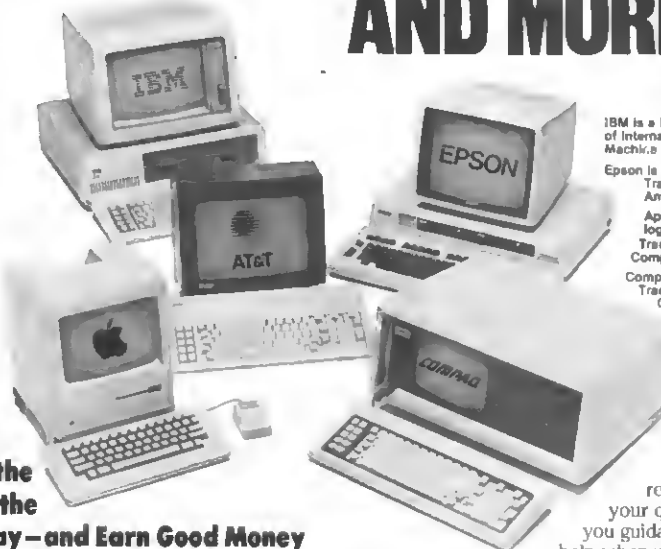
Send your name and address today for a
rather fat envelope of printer and computer
related offers.

ZYGOTRON

P.O. Box 27
Fremont, Michigan 49412

Circle 279 on Reader Service card.

GET THE KNOW-HOW TO REPAIR EVERY COMPUTER ON THIS PAGE. AND MORE.



IBM is a Registered Trademark
of International Business
Machines Corporation.

Epson is a Registered
Trademark of Epson
America, Inc.

Apple and the Apple
logo are Registered
Trademarks of Apple
Computer, Inc.

Compaq is a Registered
Trademark of COMPAQ
Computer Corporation.

© 1984 AT&T
Technologies,
Inc.

Learn the Basics the NRI Way—and Earn Good Money Troubleshooting Any Brand of Computer

The biggest growth in jobs between now and
1995, according to Department of Labor
estimates, will occur in the computer service and
repair business, where demand for trained
technicians will actually double.

You can cash in on this opportunity, once
you've learned all the basics of computers the NRI
way. NRI's practical combination of "reason-why"
theory and "hands-on" building skills starts you
with the fundamentals of electronics, then guides
you through advanced electronic circuitry and on
into computer electronics.

You Build—and Keep—a Sanyo MBC-550-2

The vital core of your training is the step-by-step
building of the 16-bit Sanyo MBC-550-2 computer.
Once you've mastered the details of this IBM-PC
compatible machine, you'll be qualified to service
and repair virtually every major brand of
computer, plus many popular peripheral and
accessory devices.

With NRI training, you learn at your own con-
venience, in your own home. You set the pace—
without classroom pressures, rigid night-school
schedules, or wasted time. You build the Sanyo
MBC-550-2 from the keyboard up, with your own
personal NRI instructor and the complete NRI

technical staff
ready to answer
your questions or give
you guidance and special
help whenever you need it.

Your NRI course includes installation and
troubleshooting of the "intelligent" keyboard,
power supply, and disk drive, plus you'll check out
the 8088 microprocessor functions, using machine
language. You'll also prepare the interfaces for
future peripherals such as printers and joysticks.

100-Page Free Catalog Tells More

Send the coupon today for NRI's big 100-page
color catalog on electronics training, which
gives you all the facts about NRI courses
in Microcomputers and other growing high-tech
career fields. If the coupon is missing, write to
NRI Schools, 3939 Wisconsin Ave., NW,
Washington, D.C. 20016.



Your NRI course
includes the Sanyo
MBC-550-2 Com-
puter with
128K RAM,
monitor, disk
drive, and
"intelligent"
keyboard; the NRI Discovery Lab[®],
teaching circuit design and operations; a
Digital Multimeter; Bundled Spread Sheet and Word
Processing Software worth \$1500 at retail—and more.

NRI SCHOOLS

McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, Washington, DC 20016

We'll give you tomorrow.

✓ CHECK ONE FREE CATALOG ONLY

- ☒ Computer Electronics with Microcomputers
- ☐ Data Communications
- ☐ Robotics & Industrial Controls
- ☐ Color TV, Audio, and Video System Servicing

- ☐ Electronic Design Technology
- ☐ Digital Electronics
- ☐ Communications Electronics
- ☐ Industrial Electronics

- ☐ Basic Electronics
- ☐ Telephone Servicing
- ☐ Small Engine Servicing
- ☐ Building Construction

For Career courses
approved under GI bill,
☐ check for details.

Name (Please Print) _____ Age _____
Street _____
City/State/Zip _____ Accredited by the National Home Study Council 179-095

Wishful Thinking

In Infocom's new fantasy, *Wishbringer*, you play a mail clerk in a small seaside town. After you deliver a mysterious envelope to the Olde Magick Shoppe things start to happen: A cat gets kidnapped, the town and its people take on new characteristics, and the Evil One and her Boot Patrol lurk around corners.

Wishbringer differs from other Infocom stories in that the way you play affects the game's outcome—*Wishbringer* has more than one ending. The game offers two levels of play.

A Model III or MS-DOS disk is available for \$39.95. For further information, contact Infocom Inc., 55 Wheeler St., Cambridge, MA 02138, 617-492-1031.

Circle 551 on Reader Service card.

Great Idea

Kamas Outline Processor from Kamasoft Inc. is available for the Models II, 4, 12, and 16 running CP/M-80 version 2.2 or above. Kamas combines outline processing and information retrieval with word processing.

Outline processing is an aid to organize ideas and categorize information. It lets you classify information into a familiar, outline structure and then alter and access the information based on that structure. It lets you hide detailed information and focus on how the ideas fit together as you create and develop material.

Word processing features include a full-screen outline editor integrated with a full-screen text editor for justifying text, setting margins, paging, line spacing, and



Infocom's latest game, Wishbringer, for the Model III and MS-DOS machines.

printing out copies.

For \$147 plus \$4 for shipping and handling you get Kamas, a three-volume User's Guide, reference cards, and a free subscription to The Kamas Report, an application newsletter. For more information, contact Kamasoft Inc., 2525 S.W. 224th Ave., Aloha, OR 97007, 503-649-3765.

Circle 563 on Reader Service card.

Turbo Read

Speed Reading Plus (\$49.50) will double your reading speed in 15 lessons. The program runs on the Models III and 4/4P with one disk drive and 48K.

The lessons start with an entry-level survey that measures your present visual skills and reading ability. The program then adjusts the program's difficulty level to your needs. At the end of each 20-minute lesson the program shows your performance. You can see or print out an overall progress report whenever you want.

The lessons include full-length stories that practice vocabulary development, vis-

ual skills, comprehension, detail recall, and generalization skills.

For further information, contact LSR Learning Associates Inc., 707 Broad Hollow Road, Farmingdale, NY 11735, 516-293-6700.

Circle 556 on Reader Service card.

Teacher's Aide

EduSoft has two programs, *Teach It* and *Test It*, available for the Models III and 4/4P with a disk drive.

Teach It (\$79.95) lets you create lesson units that include introductory information; objectives; pretest, posttest, and unit test questions; lesson text; supplementary reading lists; and even graphics. You can choose from four different question formats: multiple choice, true-false, fill-in-the-blank, or modified true-false.

Test It (\$49.95) creates a different test for every class or student. You build a bank of test questions that you can expand and save. You can select questions for a particular test or indicate the number, difficulty, and mix of questions you want. In addition to

the question formats in *Teach It*, *Test It* provides essay-format questions. The program creates paper tests with answer keys or computerized tests.

For more information, contact EduSoft, P.O. Box 2560, Berkeley, CA 94702, 800-338-7638.

Circle 562 on Reader Service card.

Beautiful View

Traveling Software's *T-View 80* transforms the Model 100's 40-column screen into a movable 60-column window on a full 80-column display.

The display activates when you use the computer's built-in text processor and telecommunications program. Word wrapping adjusts to any width up to 80 columns.

T-View 80 also includes the *Traveling Memory Manager*, which lets you keep track of file sizes.

The \$39.95 package requires 16K and is available in Radio Shack stores. For more information, contact Traveling Software Inc., 11050 Fifth Ave., N.E., Seattle, WA 98125, 206-367-8090.

Circle 553 on Reader Service card.

Window Talk

Window-Comm (\$18.95) for the Models III and 4 (48K) is a communications package that uses windows to display such features as on-line help, date/time, disk directories, file text, automatic dialing, and system configuration. You can display up to seven windows on top of the original screen information.

A multitasking print function prints files while you execute windowing functions. A single keystroke lets you



Power Problems?

SURGES!
SPIKES!
RF/EMI!
DIPS!
SAGS!
BLACKOUTS!
BROWNOUTS!

AEGIS™ Power Conditioning Equipment... THE SOLUTION
Protects From Damaging Voltage Surges, Lost Data, & Costly Down Time



SPIKE-SPIKER™

Transient Voltage Suppressors & Noise Filters
Eleven Models — All Models Rated 120V, 15A

Deluxe Power Console—2-stage transient absorber, dual 5-stage filter, common & differential mode protection, nano seconds response, clamping at 150V, 8 individually switched sockets; fused, main switch, 7' cord and status light. **\$89.95.**



Quad Power Console—6-stage transient absorber; dual 5-stage filter, common & differential mode protection, pico second response, clamping at 131V, four outlets, fused, master switch, 7' cord and status light. **\$75.95**



Mini II—Direct AC Plug-In, 2-stage transient absorber, dual 3-stage filter, common & differential mode protection; nano second response, clamping at 150V; two outlets and status light. **\$44.95**



LINE-SAVER™

Standby Uninterruptible Power System
—Clean Reliable Power System—

Model LS-240—240 watts—VA capacity—\$495**
Model LS-480—480 watts—VA capacity—\$795**

Back-up time 11 min full load, 27 min 1/2 load, 43 min 1/4 load, multiple-AC outlets 3-staged transient protection, 4-staged RF/EMI filter, sealed rechargeable internal battery master control switch, test switch, external fuses, detachable 6' cord, external DC connectors for mobil use and extended hold-up time, many more exclusive features

Call or write for free literature

Dealer inquiries invited



6584 Ruch Rd Dept
Bethlehem PA 18017



Available at your local dealer or from Kalglo
800-524-0400 in PA 215-837-0700
SPIKE-SPIKER™ orders add \$3.00 shipping & handling
LINE-SAVER™ orders add \$10.00 shipping & handling
COD add additional \$3.00
PA residents add 6% sales tax
REPS-TERRITORIES AVAILABLE



**MAJOR
CREDIT CARDS
ACCEPTED!**

AT NO. 1008-V

EPSON PRINTER PKG.



- EPSON FX-85 DOT MATRIX PRINTER
- ADJUSTABLE FORMS TRACTOR
- TABLE TOP PRINTER STAND
- EXTRA PRINTER RIBBON
- CASE OF PAPER (1800 SHEETS)
- PRINTER DUST COVER
- INTERFACE CABLE (Specify Computer-Color Computer add \$50)

NEW!

The all new EPSON FX-85 dot matrix printer prints at a quick 160 characters per second bidirectional logic seeking. PLUS a near letter quality made that prints high quality typewriter style letters. One year warranty! IDEAL FOR • TANDY 1000 • TANDY 1200HO • MODEL 4

LIST - \$599

CDA - \$469

ORDER TOLL FREE 800-526-5313

ORDERING INFORMATION AND TERMS:

Mail to: CDA COMPUTER SALES 31 Marshall Hill Rd., West Milford, NJ 07480
Include address and phone number. Shipping, handling and insurance are additional. Add 2% UPS Ground (\$3.50 minimum) UPS Blue 6% (\$5.00 minimum) NO C.O.D. Cashiers checks, money orders and credit cards ship immediately. Personal and company checks allow 15 days.

ORDER 9am-7pm EST Monday-Friday, Saturday 10-4

OUR REFERENCES: We have been selling computers since 1977 and in computer Mail Order since 1980. Our bank is First Fidelity, West Milford, NJ. O&B listed.

ORDERS 800-526-5313 INQUIRIES & IN NJ 201-728-8080

SATISFACTION GUARANTEED!

If you're not 100% satisfied, return within (7) seven days for a full refund

PIK'EM 85



**A Complete Pro Football
Prediction Program For The
1985 NFL SEASON**

63% + Accurate vs 'Spread' Since 1981
More Features — More Information In 1985 To

BEAT THE SPREAD

★ ★ FEATURES ★ ★

- Predicted Scores Each Week
- Season Schedule By Week/Team
- Records & Results:
Scores By Week
Scores By Team
Division Standings
Stats — Accumulated & Average
1983-1984 Data Base
- Auto Opponent Input
- Auto Data Update
- Printed Copy All Screens
- Easy Update—Playoffs/1986
- Dealer Inquiries Invited

49⁹⁵ INCLUDES DISC
DOCUMENTATION

- Apple II — IIe — III
- Commodore 64
- IBM PC
- TRS-80, III/IV
- Tandy 1000/1200/2000

**STATS NEEDED TO RUN PROGRAM
AVAILABLE IN LOCAL NEWSPAPERS
OR**

**WE WILL FURNISH STATS BY MAIL & MODEM
ALL 20 WEEKS — SEASON PRICE . . . 40⁰⁰**

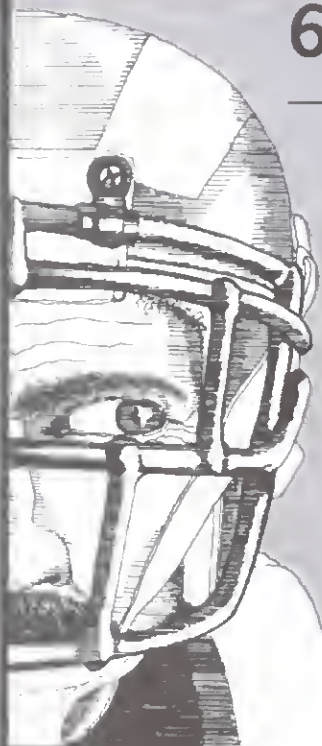
**PROGRAM COMES UPDATED THRU CURRENT
WEEK OF SEASON . . . NO EXTRA CHARGE**



Orders Call Collect
24 Hrs.
C.O.D.



MARATHON SOFTWARE DEPT. M
P. O. BOX 1349
JACKSONVILLE, TEXAS 75766
(214) 586-8212



PROFESSIONAL HANDICAPPING SYSTEMS

• PRESENTED BY PROFESSOR JONES •

GLD. Thoroughbred "Gold" Edition™
A Full featured thoroughbred analysis designed for the professional and the serious novice. **\$159.95** complete

EGLD. Enhanced "Gold" Edition™
"Gold" Edition with complete Master Bettor™ system integrated onto the same disk. This powerful program will transfer all horses and scores to the bet analysis with a "single keystroke" (Master Bettor™ included) **\$199.95** complete

GLTD. Limited "Gold" Edition™
Enables Professional Handicappers to assign specific values to the racing variables they feel are important. Create program weight based on a particular track and line time if for maximum win percentage. This program is designed for ease of use. The user needs no programming experience. (contains Integrated Bettor™) **\$299.95** complete

GD. Gold Dog Analysis™
The ONLY professional greyhound analysis available that evaluates ALL variables. **\$149.95** w/integrated Bettor **\$199.95** Limited Version **\$299.95**

MHH. Master Harness Handicapper™
Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada. **\$159.95** complete **\$199.95** w/integrated Bettor Limited **\$299.95**

Professor Pix Football™
Complete STATISTICAL ANALYSIS on Data Base allowing "Designated" previous games to be evaluated. Statistical Series **\$99.95** w/Win-Loss Power Ratings **\$149.95**

NBA. Basketball™
NBA **\$99.95** w/college **\$129.95** w/power ratings **\$149.95**

LOT. Lottery Analysis™
Statistical comparison program designed to detect subtle patterns in winning numbers and digits. Lottery (3 4 digit) **\$79.95** w/Lotto (Max 99 Digit) **\$99.95**

PC-3 Portable Computer (4K) with choice of Thoroughbred, Greyhound or Trotter™ **\$249.95** (includes portable computer and program)

M-100 Portable (24k) w/choice of Thoroughbred, Greyhound, or Trotter™ **\$649.95** (includes portable computer and program)

BROCHURE AVAILABLE

IBM™ APPLE™ TRS-80™ CPM™ COMMODORE™

Prof. Jones
1940 W. State St.
Boise, ID 83702

48 HR. FREE SHIPPING

CALL 208-342-6939

TERMS: FREE SHIPPING ALL SOFTWARE. Add \$6.00 hardware / \$6.00 C.O.D. / UPS Blue \$6.00 / Out of Country \$9.00 / NO Residents 4% / 3 weeks personal checks / Cash price only add 2% Visa, MC / Prices subject to change

Circle 281 on Reader Service card.

IT'S LIKE FREE DISKETTES

Your 5 1/4" single side disks are usable on the other side. You paid for one side, why not use the other... **IT'S FREE!**

Nibble Notch will open your new disk. It's easy... won't harm existing data. Try it, you'll be glad you did!

nibble notch II

Cuts square notch and 1/4" round "index hole." For TRS 80 I, III, and IV, Osborne, TI, Kaypro, IBM and others needing "index hole"

Call for HIGH QUALITY DISKETTES as low as 99¢

ONLY \$21.90* PLUS P&H

SATISFACTION GUARANTEED OR YOUR MONEY BACK!
TOLL FREE 1-800-642-2536
FL (305) 748-3770, 9am-6pm ET
or send check or money order to:

nibble notch®
computer products

ORDER TODAY

4211 NW 75th Terrace • Dept. 2 O 3 • Lauderhill, FL 33319

*Add \$2 (\$5 foreign) for postage & handling. FL residents add 5% sales tax.

U.S. PAT. 4,488,358

NEW PRODUCTS



Epson's DX-10 and DX-20 daisy-wheel printers provide letter-quality printing.

select functions such as send/receive files, capture information, help, and baud/parity changes.

For more information, contact Pacific Software Consultants, P.O. Box 5, San Luis Rey, CA 92068, 619-439-2577.

Circle 559 on Reader Service card.

Handsome Prints

Epson offers two letter-quality daisy-wheel printers priced under \$500. The DX-10 (\$399) is an 82-column, 10 characters-per-second (cps) parallel printer. It also offers friction paper feed and bidirectional logic-seeking.

The DX-20 (\$499), a 110-column printer, prints at 20 cps and includes all the features of the DX-10 plus a Diablo all-purpose interface (for RS-232C, IEEE-488 and parallel connections) and a 1K print buffer (expandable to 7K). An optional keyboard lets the printer function as a typewriter.

Both printers provide proportional spacing, underlining, bold print, double strike, bold double strike, superscripts, and subscripts.

For more information, contact Epson America Inc., Computer Products Division, 2780 Lomita Blvd., Torrance, CA 90505, 800-421-5426.

Circle 552 on Reader Service card.

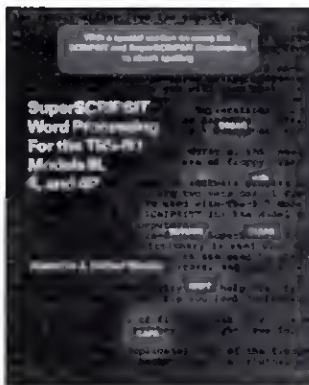
Word it Right

Jeanette J. Bleber-Moses' SuperScript Word Processing for the TRS-80 Models III, 4, and 4P describes the ins and outs of SuperScript, covering everything from basic word processing to advanced applications.

It also contains detailed advice on how to use the Script and SuperScript dictionaries, time-saving productivity tips, and a help section with over 100 solutions to common computer problems.

The softcover book costs \$17.95. For more information, contact Scott, Foresman and Company, 1900 E. Lake Ave., Glenview, IL 60025, 312-729-3000.

Circle 558 on Reader Service card.



All about SuperScript for the Models III, 4, and 4P.

Tandy 1000

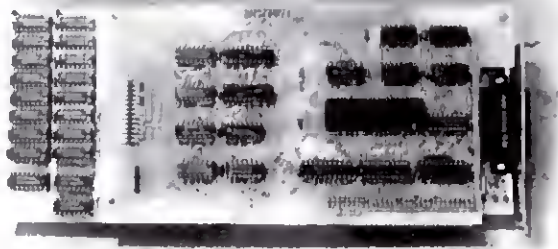
Circle 455 on Reader Service card.

TanPak™

The Ultimate Expansion for the Model 1000!

The TanPak expansion board has been designed to allow expansion beyond the scope of the standard Model 1000. Seven of the most needed functions/features have been combined into one package using only one expansion slot. Your remaining spaces are left free for future expansion needs. And the best part of all, it will save you money over the Tandy Boards

TanPak™ O.k. \$349.



Functions Include:

OMA
Serial Port
Memory up to 512K
Clock/Calendar
Printer Spooler
Memory Disk
Expansion Port for Future Options

TanPak features include:

Gold Edge Cards
Supporting Software
Pre-Tested and Burned In
Full Documentation
One Year Warranty
Expandable to 512K

TanPak™ Secondary

Made to work with a Tandy 1000 memory board as the second memory board. Featuring a Serial Port, Clock/Calendar, Memory Expansion to 256K, Printer Spooler, and Memory disk.

TanPak™ Secondary \$249.



Tandy 1000 Hard Drives

HDS Hard Drives for the Tandy 1000 allow booting directly from the Hard Drive using the Tandy DOS. All units are complete with controller, ready to plug in and use. The Internal Hard Drive Units replace the top disk drive inside the 1000, or request an external unit for only \$150. more.

10 Meg Internal \$549.
20 Meg Internal \$749.
30 Meg Internal \$1349.

TanTel

Internal 300/1200 Baud Modem \$299

8087 Board

8087 Math Co-processor board for the Model 1000.

Plugs in internally but does not use one of the 3 expansion slots
..... \$249.

(Available Fall 85)

Model 1, 3, 4 Hard Drives



Model 1, 3, 4 Hard Drives

	Primary	Secondary
5 Megabyte	\$795.	\$595.
10 Megabyte	\$1095.	\$895.
20 Megabyte	\$1295.	\$1095.
30 Megabyte	\$1895.	\$1695.

(Model 1 add \$50)

Hard Disk Subsystem Features:

- All sizes rated after formatting
- Your choice of DOSPLUG, LDOS or TRSDOS 6. x Drivers included
- NEWDOS 80/Version 2.5 Systems Available
- Up to two secondary drives may be added.
- Error checking and correcting controller.
- Buffered seek drives for improved access time
- Built in power up diagnostics.
- Plated media for long disk life.
- Heavy duty power supply
- Gold connectors used throughout
- 1 year warranty

HDS Multiplexer

Allows 4 Computers to use a HDS Hard Drive.

Base unit \$1295.

Model 3/4 RS232 Kit \$69.

Hard Drive Specialist

16208 Hickory Knoll

Houston, Texas 77059

1-713-480-6000

orderline

1-800-231-6671

Ordering Information

Use our WATS line to place your order via Visa, MasterCard, or Wire Transfer. Or, you can mail your payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. UPS ground is our standard means of shipping unless otherwise specified. Shipping cost are available upon request. Tandy and Radio Shack are Trademarks of Tandy Corporation, TanPak, and TanTel are Trademarks of Hard Drive Specialist, a division of Computek Corporation.



Mount Hold'n Fold copyholder to the right or left of your monitor.

Holding and Folding

The Hold'n Fold CRT Copyholder from Charles Leonard Information Processing Supplies provides a stand for papers or a book to free up your hands for typing. It mounts on the left or right side of your monitor.

The holder doesn't take up any desk space as it folds

against the monitor when not in use. Alternatively, you can remove it from the CRT mount and use it as a free-standing tabletop unit.

Hold'n Fold costs \$34.95. For more details, contact Charles Leonard Inc., 79-11 Cooper Ave., Glendale, NY 11385, 718-894-4851.

Circle 555 on Reader Service card.

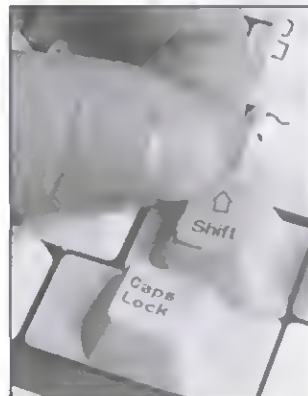
Key Change

Data-Cals (\$14.85/set) let you relabel keyboard keys for specific job functions, to meet software program requirements, or to remove present data with matched blanks.

Two formats are available: opaque Data-Cals for changing or covering up present keys and transparent Data-Cals for adding information to existing keys.

For more information, contact Aspen Graphics, Overlay Division, 1032 W. 23rd St., Tempe, AZ 85282, 602-829-8443.

Circle 554 on Reader Service card.



Data-Cals give your keyboard a new appearance.

Educational Directory

Educational Resources for Microcomputers: The 1984 Software Directory is available from Information Inc. for \$27.50.

The information in the directory is from The Microsearch Database, the largest on-line data base in the coun-

try devoted to microcomputers and microcomputer products. The directory covers educational software released in 1984 and combines product specifications with objective product reviews from micro-related magazines. It contains about 900 abstracts of information from 265 software publishers, and digests of software reviews from over 60 publications

Circle 227 on Reader Service card.

CP/M-68K TANDY-6000 MacIntosh

You purchased a computer with an MC68000 16/32-bit processor, one of the most powerful available. Now you need the software to make it run!

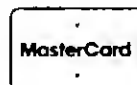
You need a powerful operating system like **CP/M-68K**. You need full-featured compilers for **FORTRAN-77, PASCAL, C, and BASIC**. And you need the compatibility to run the many CP/M-2.2 programs you are familiar with.

You need

TriSoft

4102 Avenue G
Austin, Texas 78751

1-800-531-5170
(512) 453-2233



NEW PRODUCTS

that cover educational software.

The directory comes indexed by microcomputer and/or operating system, manufacturer, product name, publication, and general subject classification. For more details, contact Information Inc., 1725 K Street, N.W., Suite 1006, Washington, DC 20006, 202-833-1174.

Circle 565 on Reader Service card.

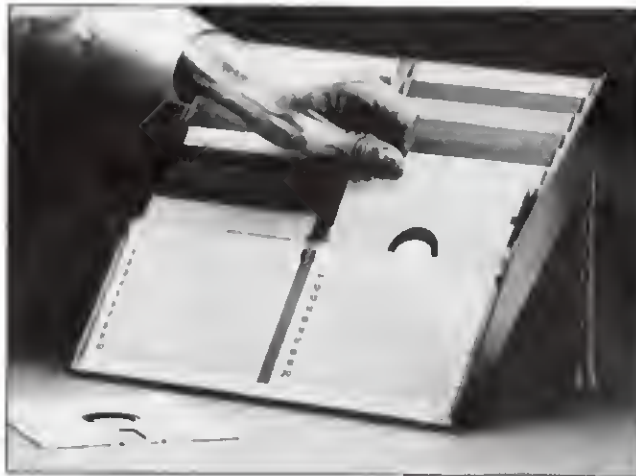
Get Organized

DiskPorter (\$29.95) from Potomac Industries uses a stairstep design to store up to 20 disks with the labels exposed.

When you open its cover, DiskPorter stands up as an easel; closed, it fits into a desk drawer or on a bookshelf. Mounting brackets let you hang DiskPorter on the wall.

For more information, contact Potomac Industries Ltd., 2300 M Street NW, Suite 400, Washington, DC 20037, 202-955-9797.

Circle 560 on Reader Service card.



Keep DiskPorter on the desk, in the drawer, or on the wall.

Code Name

Code Quest, a new release from Sunburst Communications for the Models III and 4 (48K), focuses on children's fascination with codes to develop problem-solving skills and strategies. The program is suitable for grades 4 to adult.

Code Quest encourages users to develop discrimination, classification, and pattern identification skills through codes composed of letters, numbers, and pictures. A special option lets students or teachers create their own mystery objects and clues.

For \$55 you receive a disk, back-up disk, and teacher's guide. Contact Sunburst Communications Inc. (39 Washington Ave., Pleasantville, NY 10570, 800-431-1934) for more information. Circle 557 on Reader Service card.

Ship Ahoy

Clear For Action is a new 48K Model I/III/4 game from Microcomputer Games, a division of Avalon Hill Game Co.

You are the admiral of epic sea battles in the age of wooden ships and iron men. You command up to five cannon-laden sailing vessels and attempt to out-sail and out-gun an opponent or the computer. Clear For Action has 11 predefined scenarios available, or you can design your own.

A cassette is \$25. For further information, contact Microcomputer Games Inc., 4517 Harford Road, Baltimore, MD 21214, 301-254-9200.

Circle 561 on Reader Service card.

Circle 152 on Reader Service card.

NEW PRINTERS ADDED! FIND YOURS BELOW. RIBBON SALE				EXACT REPLACEMENTS			
PRINTER MAKE, MODEL NUMBER Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.	RIBBON SIZE Inches by Yards	NEW CARTRIDGES From the various manufacturers or made in our own shop. Ready to use	RELOADS You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.	INSERTS EZ-LOAD™ DROP IN NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included			
BASE 2, DIP 61-62-84-85, MPI 88-89-GX	1/2 x 20	\$20/2 \$57/6 \$108/12	\$7/1 \$8 ea 2 or more	\$15/3 \$54/12 \$288/72			
CITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP-IMAGEW	1/2 x 18	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72			
CITOH STARWRITER F-10-40 DIABLO HYTYPE II	Carbon Film Black Fabric Black	5/16 x 130 5/16 x 17	\$18/3 \$80/12 \$342/72 \$18/2 \$51/6 \$ 98/12	\$5 ea 3-11 \$4 ea 12 or more \$8/1 \$7 ea 2 or more	\$24/6 \$42/12 \$234/72 \$21/3 \$78/12 \$432/72		
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH							
Carbon Film - DWP 210 (Hytype II)	Black (1445)	5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
DW II, DWP 410-510, RICOH 1200-1300-1600	Black (1419)	1/8 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
Rad. Green, Blue, Brown	Colors (1419)	1/4 x 130	\$21/3 \$72/12 \$420/72	\$6 ea 3-11 \$5 ea 12 or more	\$30/6 \$54/12 \$234/72		
Fabric (Long Life), DWP 210 (Hytype II)	Black (1458)	3/16 x 17	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72		
DW II, DWP 410-510, RICOH 1200-1300-1600	Black (1449)	NOT LISTED	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72		
DMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)	(1296) (1483)	Inker Loop	\$16/2 \$51/6 \$ 96/12				
OMP-200, 120, (430 Inserts & Reloads Only)	(1416)	1/2 x 20	\$20/2 \$57/6 \$108/12	\$7/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72		
OMP-400-420, LP VI-VIII, PANASONIC XXP-130	(1482)	5/16 x 14	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
DMP-500	(1442)	1/2 x 20	\$22/2 \$63/6 \$120/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
DMP-2100, TOSHIBA P1340-1350-1351	(1413)	1/2 x 20	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
LP I-II-IV, CENTRONICS 730-737-739-779 (Zip Pack)	(1414)	9/16 x 16			\$12/3 \$45/12 \$252/72		
LP III-V		1/2 x 15	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
EPSON LO 1500		1/2 x 14	\$22/2 \$63/6 \$120/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
MX-FX-RX 70-80, IBM PC (Standard Paper)		1/2 x 20	\$14/2 \$36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
MX-FX-RX 100, IBM PC (Wide Paper)		1/2 x 30	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$68/12 \$360/72		
COMMODORE 8023P, CENTRONICS 152-2		1/2 x 12	\$14/2 \$36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
ANADIX 9000 Series		1/2 x 30	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$68/12 \$360/72		
NEC Spinwriter-Carbon Film-2000-3500 (Reloads BCCOMPCO Only)		5/16 x 145	\$21/3 \$78/12 \$450/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
-Fabric	-S500-7700 (Can Reload Most Types)	1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
	-2000-3500 (Can Reload All)	1/2 x 14	\$18/2 \$51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72		
	-S500-7700 (Can Reload All)	1/2 x 13	\$15/2 \$42/6 \$ 78/12	\$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72		
OKIDATA Pacamark 2350-2410 Black		1/2 x 100	\$32 each	\$20/1 \$18 ea 2 or more	\$6/3 \$132/12 \$720/72		
Microline ML-80-82-63-82-83 (Call for ML-84 Prices)		1/2 x 16	Spool \$39/12 \$218/72				
MANNESMAN-TALLY MT-160		8mm x 11	\$19/2 \$54/6 \$102/12				
MT-180		9mm x 13	\$20/2 \$57/6 \$108/12				
-Split 80 (SP80) COMMODORE 1526 (Multistrike)		1/2 x 35	\$16/2 \$45/6 \$ 84/12				
PANASONIC XXP-1090-1091-1092-1093		5/16 x 3	\$20/2 \$57/6 \$108/12				
BROTHER HR-15-25-35	Carbon Film (Multistrike or Correctable)	5/16 x 82	\$18/3 \$60/12 \$342/72				
COMREX DX-15, II	Fabric (Call for Comrex 420 Prices)	5/16 x 17	\$15/2 \$42/12 \$ 78/72				



BCCOMPCO
800 South 17 Box 246
SUMMERSVILLE, MO 65571
(417) 932-4186

WE PAY UPS SHIPPING on PREPAID ORDERS
PLEASE INCLUDE STREET ADDRESS for UPS DELIVERY
FOREIGN ADD 15% U.S. FUNDS

DISKETTE CLEARANCE

Here's your chance to save BIG BUCKS on first-quality disks made by America's top manufacturers for their private label customers. Field Magnetics has warehoused thousands of these FACTORY-SEALED disks and can pass tremendous savings on to you.

ALL DISKS ARE SURFACE-TESTED, CERTIFIED ERROR-FREE, AND EXCEED ANSI STANDARDS. IF YOU ARE NOT COMPLETELY SATISFIED WITH THESE DISKS, YOU MAY RETURN THEM TO FIELD MAGNETICS, INC. WITHIN 30 DAYS FOR A FULL REFUND. OUR OWN LIFETIME WARRANTY APPLIES TO ALL DISKS. (Copy of warranty available upon request.)

5 1/4" In boxes of 10 disks

SS50, compares to \$26.00
now **\$8.50**

SSDD, compares to \$29.00
now **\$9.50**

DSDD, compares to \$40.00
now **\$11.00**

8" for TRS 80*
In boxes of 10 disks

SS50, compares to \$33.00
now **\$12.50**

SSDD, compares to \$39.50
now **\$15.00**

DSDD, compares to \$45.00
now **\$20.00**

*Soft-sectored. Full range of hard-sectored disks available. Please write or call.

First come, first served, so order today. This offer is good only as long as our supply lasts!

We ship UPS. Add \$2.00 for first box, \$1.00 each additional. If ordering by phone, please have credit card # and expiration date ready. We accept Visa, MasterCard, American Express, money orders, and checks.

**FIELD
MAGNETICS
INC.**

5865 SW 21st St., W. Hollywood, FL 33023. Call (305) 962-0707.

Circle 46 on Reader Service card.

Wow! Over 170 Formats!

HYPERCROSS/XT TRS-80 - CP/M - MS-DOS File Transfer

Now you can CROSS the barrier between computers! Using HYPERCROSS you can COPY files between TRS-80 disks and those from many different CP/M and IBM-PC type computers. If you have access to more than one kind of computer, or you are changing to a new machine then you need HYPERCROSS to transfer your text files, BASIC, FORTRAN, PASCAL or C programs, Visicalc files, general ledger and accounting files, data bases and even binary files.

HYPERCROSS lets you do this directly on your own TRS-80 or MAX-80 without using cables. Just put a disk from a CP/M or PC/MS-DOS (Tandy 1000, 1200, 2000 too) in one drive and a TRS-80 type DOS disk in another drive and you can copy files back and forth at will! You can copy multiple files in one go, and even copy directly from one alien disk format to another. You can also FORMAT an alien disk, display the DIRECTORY, and KILL files.

*Formats supported: IBM-PC and MS-DOS compatibles include DOS 1.1, 2.x/3.0 single and double sided and Tandy 2000. CP/M from Aardvark to Zorba, including Gromemco, DEC, Epson, HP, IBM CP/M 86, Kaypro, LNW, MAX-80 Morrow, NEC, Osborne, Otrona, Sanyo, Superbrain, Teletek, Televideo, TRS-80: all Model I, III and IV CP/Ms, Xerox, Zenith plus many others. New version XT/2.0-Plus supports an additional 100 formats including PC J-formats.

Hardware required: 48K and 2 drives minimum. Model 1 needs a doubler. Some formats need double sided or 80 track drives. 80 track skip supported.

PRICES including disk, manual and shipping. We will match any advertised price.

Hypercross CP/M with 40 single sided formats **\$49.95**

Hypercross PC/MS-DOS standard sided formats only **\$49.95**

Hypercross XT 2.0 with 70 CP/M and PC formats **\$99.95**

Hypercross XT 2.0-Plus. Now with 170 formats **\$129.95**

Upgrade at any time for price difference plus \$5 plus old disk.

Please specify TRS-80 Model I, III, 4/4P, or MAX-80.

HYPERZAP 3.2c Disk Magic!

Do you want to back up your precious copy of Copycat 3 or SU. Do you want to fix or modify a disk - if so then you need HYPERZAP! On the market for over 2 years, HYPERZAP is more than just another disk copying program - it is the program for analyzing, copying, repairing, creating floppy disks or all kinds. It will copy any TRS-80 format as well as many others such as CP/M, PC, CoCo etc. Specially designed to handle mixed density sectors on any track in any sequence. Many features for reading, writing, editing track and sector data. Hyperzap is the tool that lets you be in charge.

Make your own self booting disks. Take your own CMD file and turn it into a dual booting Mod 1/III/IV disk. Autopilot mode allows learn, saves and repeats procedures. Disk comes with fascinating examples.

Hardware needed: 48K 1 drive minimum. One version for all TRS-80 models 1, 3 and 4. Manual and disk **\$49.95** ppd. Separate Max-80 version available.

Arranger II Disk Index System

World's finest disk cataloging system. At last you can find that file when you want it. Arranger will CATALOG, SORT and FIND up to 11000 files fast! Runs on any Model I, III or IV and automatically recognizes virtually any DOS even double sided ones!

Highly recommended - **\$49.95** = \$3 ship

HYPERSOFT

PO Box 51155, Raleigh, NC 27609

(919) 847-4779 6-11 pm EST

Check, C.O.D., Mastercard and Visa Accepted.



NEW PRODUCTS

DIFFERENT TRACK



Your disks will be safe from fire and theft in the Sentry Supreme Media Safe.

Fire Escape

John D. Brush & Co. Inc. makes a fire-resistant media safe to safeguard your irreplaceable files and data against fire. The safe holds up to 200 3 1/4-inch, 80 5 1/4-inch, or 40 8-inch disks with storage space for system documentation.

Sentry Supreme Media Safe comes in two models that cost \$600 and \$750. The safe is tested and classified by Underwriters Laboratories to protect the contents at temperatures up to 1,700 degrees Fahrenheit for one hour.

A three-number changeable combination lock and a bolting system adds security against theft. For more information, contact John D. Brush & Co. Inc., 900 Linden Ave., Rochester, NY 14625, 716-381-4900.

Circle 564 on Reader Service card.

New Products Index

Reader Service Number	Company	Page
554	Aspen Graphics	122
555	Charles Leonard Inc.	122
562	EduSoft	118
552	Epson America Inc.	120
551	Infocom Inc.	118
565	Information Inc.	122
564	John D. Brush & Co. Inc.	124
563	Kamasoft Inc.	118
556	LSR Learning Associates Inc.	118
561	Microcomputer Games Inc.	123
559	Pacific Software Consultants	118
560	Potomac Industries Ltd.	123
558	Scott, Foresman and Co.	120
557	Sunburst Communications Inc.	123
553	Traveling Software Inc.	118

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

MS-DOS NEW PRODUCTS



ProDesign II—designs on your computer.

Fine Lines

American Small Business Computers Inc. has a computer-aided design package, ProDesign II, available for the Model 1000 for \$299.

ProDesign II is designed primarily for engineers and architects, but you can use it for interior design and presentation graphics. It supports a mouse and digitizing pads for data input, although they're not required. You can send drawings to most dot-matrix printers and plotters.

You draw on a "virtual screen," which gives you a drawing area four times the size of the physical screen. Drawing features include lines, curves, circles, ovals, arcs, area fill, and extensive text capabilities. ProDesign II has on-screen zoom and rotate, auto dimensioning, and complete editing capabilities. You can also move, copy, rotate, and expand or reduce sections of the drawings.

The program supports user-created symbol libraries and overlay capabilities. You need a 512K computer with

color graphics, two drives, and a printer or a plotter. For more information, contact American Small Business Computers, 118 S. Mill St., Pryor, OK 74361, 918-825-4844.

Circle 578 on Reader Service card.

Show Your Depreciation

Depreciation Plus (\$395) from Good Software Group is a fixed-asset management package for the Models 1000 and 1200. It provides three applications for fixed-asset management: asset control, accounting and depreciating assets for tax purposes, and accounting and depreciating assets for financial reports.

The package is available through Radio Shack. For more information, contact Good Software Group, 12900 Preston Road, Dallas, TX 75230, 214-239-6085.

Circle 574 on Reader Service card.

Board it Up

The TanPak from Hard Drive Specialist is a multi-function board for the Model 1000. It contains the Model

Circle 198 on Reader Service card

FINALLY!

THE ULTIMATE ROM



For the Tandy Models 100 and 200
and NEC PC-8201

One ROM chip contains three acclaimed programs:
IDEA1™—Outline processor. One of the hottest-selling programs for the Model 100 and NEC PC-8201.

T-base™—Database management. The database reviewers have rated as number one for the Model 100.

T-Writer™—Text formatter. Still the favorite with owners of the Model 100 and NEC PC-8201.

Added memory—32K in program memory
Added convenience—always ready—no need to load from cassette
30-Day Money-Back Guarantee

Introductory Special
Only \$199.95*—Save \$30 To order call toll free 1-800-343-8080

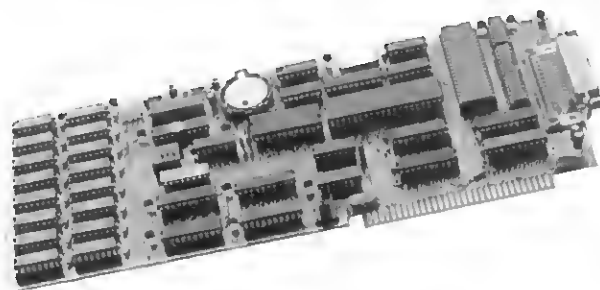
Traveling Software, Inc.
11050 Fifth Avenue N.E.
Seattle, WA 98125
(206) 367-8090

*Price after September 20, 1985 will be \$229.85
Trademark: Guardian ROM, (C) 1985 Polar Engineering



Circle 414 on Reader Service card.

Introducing MFB-1000™



Designed for use with the new Tandy 1000 Personal Computer, the MFB-1000 contains three of the most needed functions on a single 10" expansion card. Using either 64K or 256K DRAM chips, the MFB-1000 can be populated with up to 512K of memory bringing the total system memory to 640K. Additionally, the board also includes an IBM compatible serial communications port (identified as COM1) and a battery backed real time clock/Calendar. As required by the design of the Tandy 1000, the MFB-1000 also contains its own DMA Controller. However, the DMA Controller can be disabled, making the MFB-1000 compatible with the Tandy 1200 as well as other IBM compatible machines.

■ 128K RAM \$329.95 ■ 256K RAM \$369.95 ■ 512K RAM \$429.95
ORDERING INFORMATION

Visa/Mastercard orders accepted. Allow 2 weeks for personal checks to clear. Add \$3.00 shipping and handling. C.O.D. orders add \$2.00. N.J. residents add 6% sales tax.



inc.
P.O. Box 813
911 Columbia Avenue
N. Bergen, NJ 07047
(201)330-1898

Dealer Inquiries Welcome

IBM is the registered trademark of International Business Machines
Tandy 1000/1200 are registered trademarks of Tandy Corp.

THE RS-232

MODEL III

MODEL 4



State of the art technology in board design, our direct replacement of Radio Shack's internal RS-232 board, mounts inside the Model III or 4 on the existing brackets. All cables, screws and complete mounting instructions are included. Non-technical people will find that installation is quick, straight forward and simple requiring less than 15 minutes to complete.

Total compatibility with Radio Shack's and all existing software is maintained. Software programmable baud rates from 50 to 19,200 baud are supported along with programmable word length, stop bits, and parity. May be utilized in either half or full duplex operation.

**Outstanding Value
At
Only \$69.95**

Guaranteed One Full Year
Dealer inquiries invited

Please forward payment by a cashier's
check or money order.

Visa or MasterCard also accepted.

Add \$3.00 shipping & handling
(Foreign orders quoted on request)

CompuLogic

4831 SOUTH HAMPTON RD. LB4
DALLAS, TEXAS 75232
214/330-1332

MS-DOS NEW PRODUCTS



Enter a golf tournament on your computer and win prizes.

1000 direct memory access circuitry, a serial port, clock, and additional memory (128K, 256K, or 512K). You can get a 256K upgrade kit for the 128K and 256K boards.

The 128K version costs \$399. For more details, contact Hard Drive Specialist, 16208 Hickory Knoll, Houston, TX 77059, 800-231-6671. Circle 576 on Reader Service card.

and combined charts.

The menu-driven program can send output to a monitor, printer, or plotter. It requires 64K and one disk drive. For more information, contact Venture Software, 16200 Ventura Blvd., Encino, CA 91436, 818-986-4110.

Circle 573 on Reader Service card.

Tee Totaler

Golf's Best simulates the world's top golf courses on your MS-DOS computer. You challenge the course by selecting clubs, force of swing, direction, and so on.

Golf's Best features color graphics, sound effects, close-ups, aerial views, regular and championship tees, periodic changes in pin placements, and scorecard.

The package comes with registration forms so you can enter the 1 STEP computer golf tournament. You play a specified course as many times as you want and send in your best score. 1 STEP Software offers trip and cash prizes.

One to four players can play Golf's Best. The package costs \$49.95. For more information, contact 1 STEP Software Inc., Charlotte Plaza, Suite 1300, Charlotte, NC 28244, 800-525-4653.

Circle 577 on Reader Service card.

Incorporate Yourself

ComputerLaw Inc.'s Forming Your Own Corporation (\$25) for the Models 1000, 1200, and 2000 helps you incorporate your business without paying unnecessary legal fees.

The disk includes articles of incorporation, bylaws, minutes, sample corporate purposes, waivers, transmittal letters, addresses of state incorporation agencies, and a commentary to the language of incorporation forms so you can complete the paperwork necessary for incorporation without having to consult an attorney.

For more information, contact ComputerLaw Inc., 1087 Taft St., Rockville, MD 20850, 301-340-8100.

Circle 575 on Reader Service card.

Picture Show

Bottomline Graf (\$99) produces graphics presentations in pie, bar, and line formats from numerical data on MS-DOS-compatible computers. It provides up to 12 intervals on the X- and Y-axes along with clustered or stacked bar graphs, multiple line graphs,

Convert That Basic

TRSTOMS (\$50) lets you convert Basic programs for the Models II, III, 4, 12, 16, and 100 to PC-DOS and MS-DOS Basic. It saves you up to 90 percent of manual conversion time.

NEW FROM 80 MICRO

Classifieds

GET THE ATTENTION YOU DESERVE

Tell more than 200,000 dedicated, interested TRS-80 users about your product or service with an efficient and economical **80 Micro** classified ad.

You'll reach the most people in the market for the least amount of money!

With **80 Micro's** well-established audience of involved buyers, sellers, and swappers, your ad is bound to get fast results!

For more information, write to:

80 Micro

Attn. Classified Manager

80 Pine Street

Peterborough, NH 03458



Softerm 2000 lets your computer do the talking.

The program operates on any MS-DOS machine, including the Models 1000, 1200, and 2000. You must transfer a TRS-80 Basic program to an MS-DOS disk before you can use TRSTOMS on it. Then TRSTOMS changes most Basic instructions to conform to MS-DOS Basic. It converts file names, adds spaces where required, and converts instructions like PRINT@, OPEN "D", POS, and others. It also adjusts Tab

and Locate commands to compensate for the different notation system.

TRSTOMS also prints out a conversion report indicating the conversions it made and flagging graphics or control codes that may present problems under MS-DOS.

You need a 64K MS-DOS machine with one disk drive and a printer to run TRSTOMS. You can buy a demo disk for \$7 and later credit that to a future purchase. For

more information, contact Ramona Enterprises Inc., 1087 Taft St., Rockville, MD 20850, 301-340-8100.

Circle 570 on Reader Service card.

Term Talk

Softronics Inc. offers their terminal program, Softerm, for the Model 2000. Softerm 2000 (\$195) includes keyboard macros, a built-in phone book for automatic dialing, and simultaneous capture to print on disk. It also supports

popular transfer protocols like Xmodem and emulates 24 popular terminals so you can access mainframe computers. An additional emulation lets the Model 2000 act as a terminal for a Model 16 Xenix multiuser system.

You can buy Softerm 2000 in your Radio Shack store, or contact Softronics Inc. (3639 New Getwell Road, Suite 10, Memphis, TN 38118, 901-683-6850) for more information.

Circle 571 on Reader Service card.

MS-DOS New Products Index

Reader Service Number	Company	Page
577	1 STEP Software Inc.	126
578	American Small Business Computers	125
575	ComputerLaw Inc.	126
574	Good Software Group	125
576	Hard Drive Specialist	125
570	Ramona Enterprises Inc.	126
571	Softronics Inc.	127
573	Venture Software	126

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

Circle 484 on Reader Service card.

Graphics Solutions

High-Resolution Software and Hardware

GBASIC 3.0 - Radio Shack Model 4/4P/III hi-res board owners take note of an enhanced graphics Basic; GBASIC 3.0 not only has an equivalent for each of the BASICG commands but adds a number of important new commands while using less memory. The hi-res screen can be printed on any of 20 popular printers or saved to or loaded from disk without leaving Basic. The software works with TRSDOS 1.3, 6.1.2, 6.2, LDOS, NEWDOS80, and DOSPLUS. The disk contains 40 graphics programs/files. Also included is a detailed manual which includes assembly language entry addresses. \$49.95. (Specify Model 4 or III mode or add \$10 for both.)

The following nine programs run on a Model 4/4P/III equipped with a Radio Shack graphics board and GBASIC 3.0 or a Micro-Labs Grafyx Solution board:

DRAW - A powerful full screen graphics drawing and editing program. \$39.95.

BIZGRAPH - Create business graphs from hand-entered or VisiCalc data. \$98.00.

xT.CAD - Professional drafting aid which outputs to a printer or plotter. \$449.95.

CHESS - A very powerful program with 10 skill levels, 40 play options. \$49.95.

REVERSI - Play Othello with 10 skill levels, 20 execution options. \$39.95.

3D Tic-Tac-Toe - Play the computer or a friend on a 4 x 4 x 4 matrix. \$29.95.

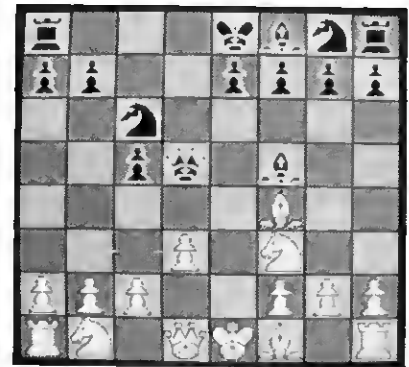
3D-PLOT - View three-dimensional data from any perspective or angle. \$39.95.

MATHPLOT - Plot equations of the form $Y=F(x)$ with auto scaling. \$39.95.

SURFACE PLOT - Plot three-dimensional equations of the form $Z=F(x,y)$. \$39.95.

GRAFYX SOLUTION. Plug-in, clip-on board enhances any Model 4/4P/III to provide 640 x 240 / 512 x 192 dot graphics. Comes with over 40 programs and files including GBASIC 3.0 which adds over 20 new commands. \$199.95.

JOY-MOUSE. Allows a Radio Shack CoCo joystick, mouse, or touch pad to be connected to any Model 4/4P/III. Hardware provides X, Y position values from 0 to 255. A built-in speaker produces sound from the cassette port. \$129.95.



G.I.N.A. Software program for the Model 4/4P/III/I which uses the standard block graphics screen to display a window to a larger 65536 x 65536 dot tablet. The arrow keys are used to draw two or three-dimensional figures. The display can be scaled, shifted, or rotated in any dimension. The final picture is printed in hi-res on Radio Shack, Epson, Gemini, NEC 8023, or Prowriter printers. \$75.00.

Please specify your exact system configuration when ordering or requesting information. Payment may be by check, Visa, Mastercard, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 5% sales tax.

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

A Little Light Pen Musing

Send your questions dealing specifically with Tandy products, services, or policies to Ask Tandy, 80 Micro, 80 Pine St., Peterborough, NH 03458. Be sure to specify which model computer you use. A representative at Tandy's Fort Worth, TX, headquarters supplies all answers published here.

Q: I've waited breathlessly for an announcement about a light pen for the Tandy 1000. In the June 1985 Ask Tandy column, I read that Tandy is only "considering" bar code systems for computers other than the 100/200. Tell me it isn't so. Is this a change in intention, since Tandy included a light pen port on the 1000? Can I use other pens on the 1000 without modification?

A: First of all, don't confuse a light pen, which works with your

computer's screen, with a bar code reader, which reads those little encoded, printed stripes. One has nothing to do with the other.

We included a light pen port on the 1000 for future expansion. Right now, we feel light pens are too expensive. When they get more cost effective, chances are good we'll have one. Sorry, I have no information about other light pens that might work.

Q: How long after buying a Tandy computer can I buy a service contract? After my equipment is repaired, can I see it before leaving the store?

A: Service contracts are available any time. If your unit isn't still under warranty, we require a check-out at a fee of \$25 per system. If we find

any defects, you must have them repaired before you buy a contract.

Small systems are easy to check out prior to your picking them up. Complex systems usually aren't in the store prior to delivery, but your store can probably work something out with you, depending on the circumstances. Check with them.

Q: You've traditionally offered computers in various configurations. Why no 128K version of the Model 4?

A: A couple of reasons: First, since Basic won't address the second 64K except as a RAMdisk, we expected the 64K version to be far more popular. And, it would be prohibitively expensive to have our stores carrying two versions of a computer so easy to upgrade. ■

THE CLASSIFIED 80micro

DISKS & SUPPLIES

Disks, Program Packaging. Low prices on BASF, Memorex, Verbatim, Dysan. Binders, Slips like Tandy 1000, 2000. Much more. Free Catalog. Anthropomorphic, 378 East Saint Charles, Lombard, IL 60148 (312) 629-5160.

Dollar Diskettes! DS/DD w/Hub ring. Dollar Brand are available in packs of 10 for \$10.00. Add \$2.00 postage and handling to total order. No minimum no maximum lifetime guarantee. 4831 S. Hampton, LB-41 Dallas, TX 75232.

SOFTWARE

Coin Collectors! Unique program uses built-in market value file and prices your U.S. collection. Brochure available. Compu-Quote 6914 Berquist, Canoga Park, CA 91307 (818) 348-3662.

Masonic Lodge Secretary's Program. Models III and Native 4/4P versions. \$85.00 ppd. John Taylor, 106 Busch Hill, Wetumpka, AL 36092.

Pageone—Quick, easy. Model I, III word processor. \$49.95 or SASE for information. Roy Scott, Box 1508, Bakersfield, CA 93302-1508.

Powerful Mailing List Program. Completely menu driven. Specify LDOS, NEWDOS, TRSDOS, TRSDOS6. \$19.95 Mail check or money order to: Zarchy Data Processing, P.O. Box 1012, Woodbridge, NJ 07095. BBS support at 201-494-3558.

SERVICES

Get the attention you deserve. 80 Micro is now offering classified ads at a special introductory price. Reach over 100,000 readers with news of your product or service. Classified ads on the pages of 80 Micro get results. Write to 80 Micro 80 Pine St. Peterborough, NH 03458 attn: Classified manager for information and deadlines.

PUBLICATIONS

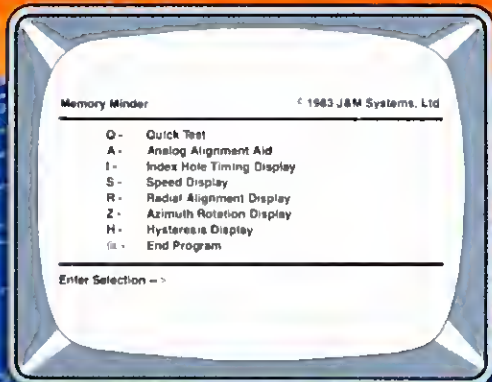
Close-out Sale! TRS-80 Encyclopedia by Wayne Green Inc. 10 volume hardcover was \$199.50 now \$79.99. 10 volume softcover was \$109.50 now \$58.99. Mail to DiskCount Data see page 7 for address.

HARDWARE

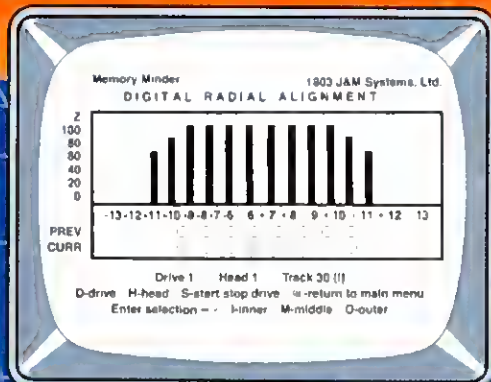
Model 100 64K RAM modules only \$375 each. 8K RAM modules \$34.95 each. 24K RAM modules for Tandy 200 \$139 each. PG Design Electronics, Inc. 66040 Gratiot, Richmond, Michigan 04862 (313) 727-2744.

MEMORY MINDERTM

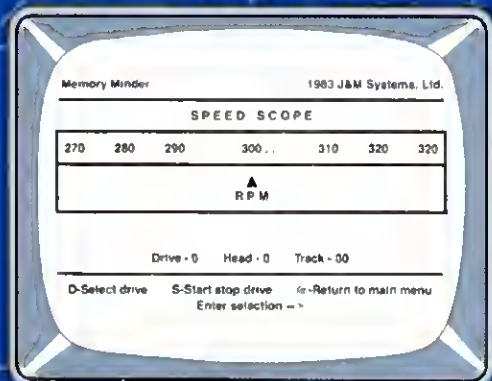
... A UNIQUE APPROACH TO DISK RELIABILITY!



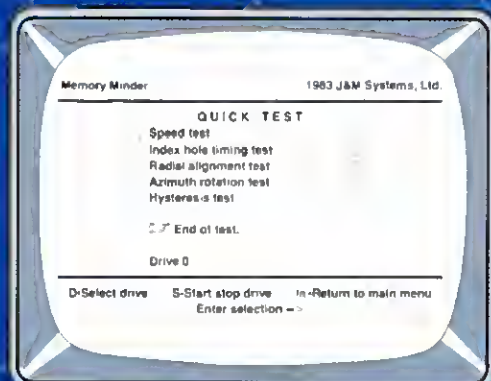
Select any one of seven tests to perform preventive maintenance or to isolate problems. Simple, single-letter commands make MM easy to use! Use MM to align the head, adjust the index hole detector, or adjust the speed.



Use the MM Radial Alignment Test to check the head alignment of your drives. No need for an oscilloscope or other expensive test equipment!



Check the motor speed of your drives. Or, you can even use the Speed Test to adjust the drive speed. No need for any test equipment!



Use the Quick Test to quickly and automatically test five of the most important performance parameters of your drives. Monitor your drives for long term drift. Isolate problems quickly and automatically!

PROTECT YOUR DATA.

Now you can make sure your data is being recorded properly by the use of the revolutionary *Memory Minder*.

The Memory Minder from J & M Systems, tests your disk's performance and calibration without any additional equipment! It measures your disk's performance and displays it on your screen.

This is the most comprehensive disk diagnostic program available for your TRS-80 microcomputer. You can even adjust drive alignment while watching the display!

Spot problems *before* they endanger your data! If you own a disk drive, you *need* the *Memory Minder*!

TRS-80 Model III/4	Price:
1 - 50 tpi Single Side (Standard)	\$79
2 - 40 tpi Double Side	\$89
3 - 96 tpi Double Side	\$129
Includes 50 tpi & 96 tpi program diskettes	
TRS-80 Model -I	
1 - 40 tpi Single Side Single Density	\$89
TRS-80 Color Computer and TDS-100	
1 - 50 tpi Single Side (Standard)	\$79
2 - 40 tpi Double Side	\$99

MM also available for other models
J & M SYSTEMS IS THE DRIVING FORCE!



J & M SYSTEMS, LTD.

15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4132

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • KAYPRO™



FREE--TRS-80 Mod I, III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC 80).

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- add \$3 for shipping in UPS areas
- add \$4 for C.O.D. or non-UPS areas

- add \$5 to CANADA or MEXICO
- add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change. Delivery subject to availability.

COMPUTRONICS!

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

TRS 80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. - KAYPRO trademark Non-Linear Systems, Inc. - TEL EVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. - ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSON trademark Epson Corp.